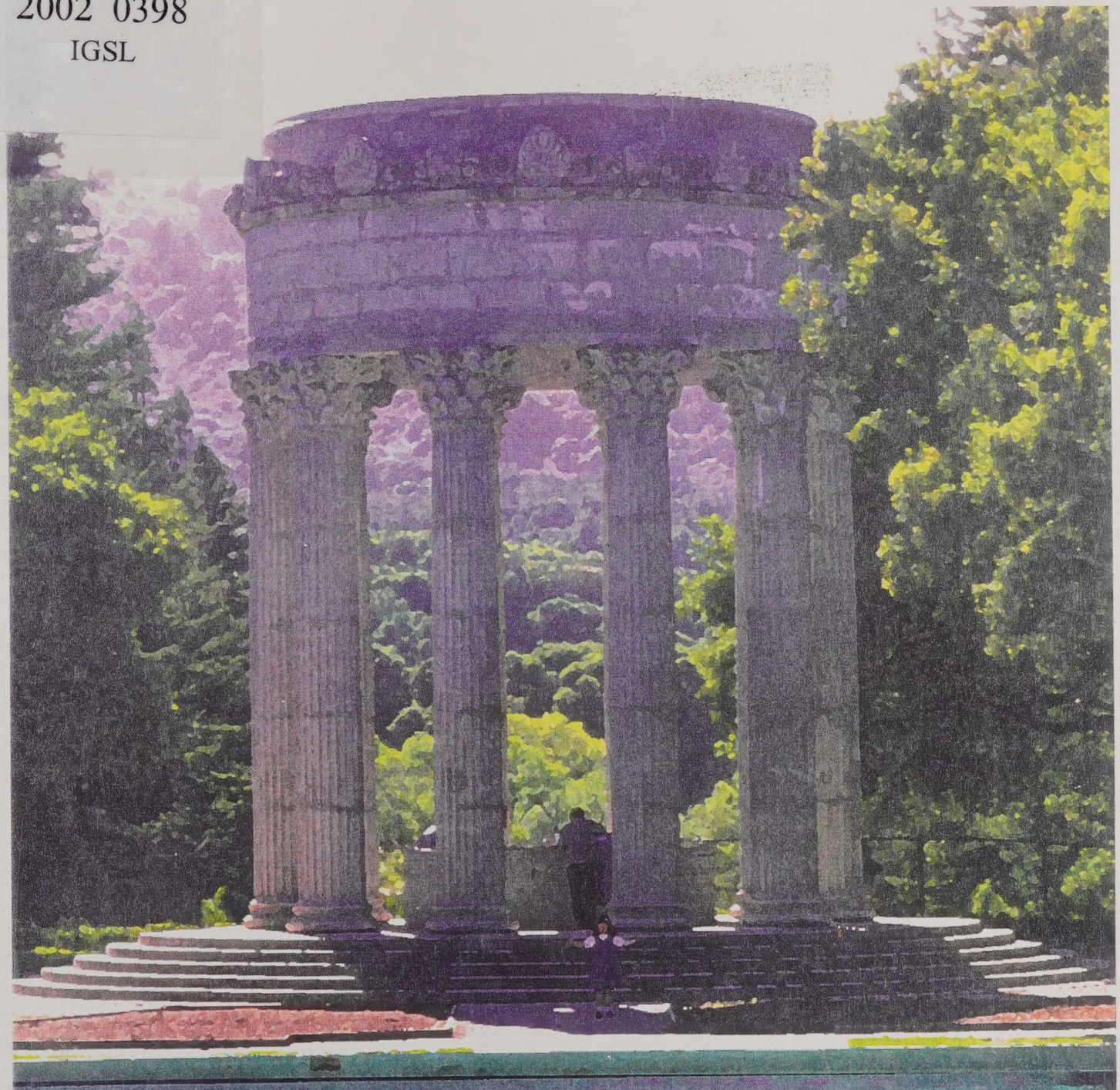
2002 0398
IGSL



Draft

Peninsula Watershed Management Plan

San Francisco Public Utilities Commission
April 1998

Digitized by the Internet Archive
in 2025 with funding from
State of California and California State Library

https://archive.org/details/C101747408

2002 0398

Peninsula Watershed Management Plan

prepared for

San Francisco Water Department

prepared by

EDAW, Inc.

in association with

Environmental Science Associates
Montgomery Watson
Public Affairs Management
Wildland Resource Management

TABLE OF CONTENTS

Executive Summary

1.0 Introduction

1.1 Purpose and Vision 1-1
1.2 Management Plan Organization 1-3
1.2.1 Appendices 1-3
1.2.2 Plan Elements 1-4
1.3 History and Organization of the San Francisco Public Utility Commission 1-5
1.3.1 History 1-5
1.3.2 Organization 1-6
1.4 SFPUC Water System 1-8
1.4.1 Regional Location 1-8
1.4.2 Water System Overview 1-8
1.4.3 Alameda Watershed 1-10
1.4.4 Peninsula Watershed 1-12
1.5 Planning Process 1-15
1.6 Peninsula Watershed Plan Description 1-18

2.0 Existing Conditions and Resource Sensitivity

2.1 Introduction 2-1
2.2 Geology and Soils 2-1
2.3 Hydrology 2-3
2.4 Water Quality 2-3
2.5 Vegetation 2-5
2.6 Wildlife 2-8
2.7 Fisheries 2-12
2.8 Cultural Resources 2-12
2.9 Aesthetics 2-14
2.10 Fire Hazard 2-15
2.11 Land Status and Adjacent Uses 2-16
2.12 Transportation and Access 2-19
2.13 Utilities 2-19
2.14 Operations and Maintenance 2-20
2.15 Recreation 2-20
2.16 Other Watershed Activities 2-21
2.17 Revenue Generation 2-21
2.18 Existing Codes and Regulations 2-21
2.18.1 Environmental Review 2-21
2.18.2 Other Relevant Codes & Regulations 2-24
2.19 Related Projects and Studies 2-25

3.0 Watershed Management Issues

3.1 Introduction 3-1
3.2 Water Quality 3-2
3.3 Water Supply 3-5
3.4 Natural and Cultural Resources 3-5
3.5 Fire and Safety 3-8
3.6 Watershed Activities 3-9
3.7 Fiscal 3-11
3.8 Public Awareness and Agency Participation 3-13

4.0 Watershed Management Goals and Policies

4.1 Introduction 4.1-1
4.2 Water Quality (WQ) 4.2-1
4.3 Water Supply (WS) 4.3-1
4.4 Vegetation (V) 4.4-1
4.5 Wildlife (W) 4.5-1
4.6 Aquatic Resources (AR) 4.6-1
4.7 Cultural Resources (CR) 4.7-1
4.8 Fire (F) 4.8-1
4.9 Safety and Security (S) 4.9-1
4.10 Watershed Activities (WA) 4.10-1
4.11 Administration and Finance (AF) 4.11-1
4.12 Public Awareness and Agency Participation (PA) 4.12-1

5.0 Watershed Management Actions and Guidelines

5.1 Introduction 5.1-1
5.2 Stormwater (sto) 5.2-1
5.3 Hazardous Materials and Contaminants (haz) 5.3-1
SFPUC Facilities and Procedures 5.3-1
Spill Containment and Response 5.3-2
Coordination and Collaboration 5.3-3
5.4 Waste - Human and Animal (was) 5.4-1
SFPUC Facilities and Procedures 5.4-1
Lessees and Non-SFPUC Facilities 5.4-1
Additional Surveys and Monitoring 5.4-2
Coordination and Collaboration 5.4-2
5.5 Roads (roa) 5.5-1
Assessment and Management of Existing Roads 5.5-1
New Roads 5.5-3
5.6 Conservation and Reclamation of Water (con) 5.6-1
5.7 Fire Management (fir) 5.7-1
Fire Pre-Suppression 5.7-2
Fire Defense Improvement 5.7-2
Fuel Management 5.7-3
Fire Response 5.7-4
Fire Management Plan Implementation 5.7-5
Monitoring 5.7-5

5.8 Safety and Security (saf) 5.8-1
Law Enforcement 5.8-1
Safety and Security Program 5.8-1
Watershed Reservoir Patrol 5.8-4
Watershed Manual 5.8-4
Coordination and Collaboration 5.8-5
5.9 Vegetation, Soil, and Pest Management (veg) 5.9-1
Vegetation Management Plan 5.9-2
Assessment Prior to New Activities 5.9-4
Restoration 5.9-6
Exotic Species 5.9-6
Forest Management 5.9-7
Soils Management 5.9-7
Integrated Pest Management 5.9-8
Coordination and Collaboration 5.9-9
5.10 Wildlife (wil) 5.10-1
Assessment Prior to New Activities 5.10-1
Wildlife Movement 5.10-2
Wildlife Habitat 5.10-2
Sensitive, Rare, Threatened, and Endangered Species 5.10-2
Future Studies and Monitoring 5.10-5
Coordination and Collaboration 5.10-6
5.11 Aquatic Zone Protection (aqu) 5.11-1
Assessment Prior to New Activities 5.11-1
Reservoirs and Reservoir Shorelines 5.11-2
Stream Channels and Banks 5.11-3
Wetlands 5.11-3
Sedimentation Basin Management 5.11-3
Monitoring 5.11-4
5.12 Fishery Resources (fis) 5.12-1
Fish Migration 5.12-1
Habitat Management 5.12-2
Future Studies and Monitoring 5.12-2
Coordination and Collaboration 5.12-3
5.13 Cultural Resources (cul) 5.13-1
Assessment Prior to New Activities 5.13-1
Protection of Existing Resources 5.13-2
Monitoring 5.13-3
5.14 Environmental Compliance (enr) 5.14-1
Environmental Compliance Responsibilities 5.14-1
Assessment Prior to new Activities/Leases 5.14-2
EIR Mitigation Measures 5.14-2
Coordination and Collaboration 5.14-2
5.15 Lease and Permit Requirements (lea) 5.15-1
Public Access Permits 5.15-1
Land Use Lease and Permit Requirements 5.15-2

5.16 Public and Agency Outreach (pub) 5.16-1
Public Education Program 5.16-1
Facilities and Information 5.16-1
Docent Program 5.16-5
Coordination and Collaboration 5.16-5
5.17 Staffing and Training (sta) 5.17-1
Staffing 5.17-1
Enforcement Procedures Training 5.17-2
Watershed Resource and Watershed Management Plan Training 5.17-2
Fire Management and Emergency Response Training 5.17-3
5.18 Fiscal Framework (fis) 5.18-1
Costs and Benefits of Watershed Activities 5.18-1
Lease and Permit Fees 5.18-2
Watershed Management Funding 5.18-2
Funding Sources 5.18-2
Acquisition of Watershed Lands 5.18-3
Fines 5.18-4
5.19 Information Management (inf) 5.19-1
Watershed Natural Resources Center 5.19-1
GIS Operations and Database Maintenance 5.19-1
Watershed Web Page Maintenance 5.19-2
Coordination and Collaboration 5.19-2
5.20 Design and Construction Requirements (des) 5.20-1
Review Process for Proposed Plans and Projects 5.20-1
Construction Fencing 5.20-2
Design Guidelines 5.20-2
Accessibility Compliance 5.20-4
5.21 Southern Peninsula Watershed Golf Course (gol) 5.21-1
Water Quality Protection 5.21-2
Pest Management 5.21-2
Southern Peninsula Golf Course Oversight Committee 5.21-2
Natural Resource Studies and Monitoring 5.21-2
5.22 Fifield/Cahill Ridge Trail (tra) 5.22-1
Alternative A: Unrestricted Access with Termination at Highway 92/Skyline Boulevard 5.22-4
Alternative B: Unrestricted Access with Termination at Skyline Quarry 5.22-7
Alternative C: Access by Annual Permit 5.22-9
Alternative D: Docent-Led Access 5.22-11
Alternative A/B: Programmatic Skyline Boulevard Alignment from Highway 92/Skyline Boulevard 5.22-14

6.0 Phasing and Implementation 6-1

List of Acronyms A-1

Glossary of Terms G-1

List of Figures

Figure 1-1 SFPUC Organization 1-6
Figure 1-2 Regional Location 1-9
Figure 1-3 Overall SFPUC Water System 1-10
Figure 1-4 Southern Alameda Creek Watershed 1-12
Figure 1-5 Alameda Watershed Lands 1-13
Figure 1-6 Peninsula Watershed Lands 1-14
Figure 1-7 Planning Process 1-15
Figure 1-8 Comparative Evaluation of Alternatives 1-17

Figure 2-1 Composite High Sensitivity Zones 2-2
Figure 2-2 Erosion and Land Instability 2-4
Figure 2-3 Composite Water Quality Vulnerability Zones 2-6
Figure 2-4 Vegetation Communities 2-7
Figure 2-5 Sensitive Vegetation Communities and Species 2-9
Figure 2-6 Sensitive Wildlife Habitats and Species 2-11
Figure 2-7 Composite Ecological Sensitivity Zones 2-13
Figure 2-8 Known Cultural Resources and Potential Sensitivity Zones 2-15
Figure 2-9 Wildfire Severity 2-17

Figure 4-1 Review Process for Proposed Plans and Projects 4.10-5

Figure 5-1 Sample Watershed Goals and Policies Compliance Checklist 5.20-3
Figure 5-2 Proposed Southern Peninsula Watershed Golf Course Location 5.21-3
Figure 5-3 Alternative Fifield/Cahill Ridge Trail Alignments 5.22-3

List of Tables

Table 2-1 Special Status Plant Species Reported from the Peninsula Watershed 2-10

Table 5-1 Derivation of Watershed Management Actions from Goals and Policies 5.1-3
Table 5-2 Management Action Topics, Acronyms, and Page References 5.1-4

Table 6-1 Implementation of the Management Actions by Phase 6-3

List of Appendices

The following documents and memoranda were prepared during the course of the watershed management planning process. This information was gathered at specific points in time during the planning process and does not necessarily represent the information contained in the Peninsula Watershed Management Plan. Some specific issues noted in the following appendices may have been refined through the planning process. These refinements are reflected in the Peninsula Watershed Management Plan.

Appendices are available upon request from the San Francisco Public Utilities Commission

Appendix A. Peninsula Watershed: Management Plan Elements and Miscellaneous Material[1]

Volume I

A-1 Peninsula Watershed Fire Management Element, August 1996

A-2 Southern Peninsula Watershed Golf Course Element, March, 1998

A-3 Fifield/Cahill Ridge Trail Element, March, 1998

Volume II

A-4 Peninsula Watershed Natural and Cultural Resources, June 1994

Appendix B. Peninsula Watershed: Map Digest[1]

Slope
Aspect
Vegetation Communities
Landslide Susceptibility and Faults
Sensitive Vegetation Communities
Sensitive Wildlife Habitats and Species
Soil Sensitivity
Composite Water Quality Vulnerability Zones
Composite Ecological Sensitivity Zones
Cultural Resources and Potential Sensitivity Zones
Wildfire Severity
Erosion and Land Instability
Composite High Sensitivity Zones

Appendix C. Peninsula and Alameda Watersheds: Surveys and Technical Memoranda[2]

Volume I

C-1 Watershed Sanitary Survey for the Alameda and Peninsula Watersheds, October 1995

Volume II

C-2 Technical Memorandum #1: San Francisco Water System Facilities and Practices, April 1993

C-3 Technical Memorandum #2: Water Quality Vulnerability Zone Development, March 1994
C-4 Technical Memorandum #3: Sediment Yields of Alameda and Peninsula Watersheds, September 1994
C-5 Technical Memorandum #4: Visual Resources, November 1996
C-6 Technical Memorandum #5: Best Management Practices (to be completed)
C-7 Technical Memorandum #6: Economic Profile of Watershed Land Management by the San Francisco Water Department, November 1993
C-8 Technical Memorandum #7: Demographic Profile of Areas Adjacent to Peninsula and Alameda Watershed Lands, November 1993
C-9 Technical Memorandum #8: General Plans Review, June 1994
C-10 Technical Memorandum #9: Utilities and Infrastructure Review, June 1994
C-11 Technical Memorandum #10: Regional Recreational Facility Inventory, June 1994
C-12 Technical Memorandum #11: SFPUC Policies, September 1993

Appendix D. Peninsula and Alameda Watersheds: Planning Process and Public Participation Reports and Materials[2]

Volume I

D-1 Public Opinion Survey Report, February 1994
D-2 Technical Memorandum #12: Watershed Management Planning Process, September 1996
D-3 Agency Interview Summaries, February 1994

Public, Agency and Staff Workshop Summaries

Volume II

D-4 Workshop Summary Report #1, May 1993
D-5 Agency Workshop Report #1, July 1993
D-6 Agency Workshop Report #2, January 1994

Volume III

D-7 SFWD Staff Workshop Report #1, February 1994
D-8 Public Workshop Report #2, April 1994
D-9 Public Workshops and Joint Agency Workshop #3, June 1994
D-10 Summary of SFPUC Hearings on the San Francisco Watershed Management Plans, January 1995
D-11 Summary of Public Involvement and Agency Coordination Activities, August 1992-June 1996
D-12 Presentation Boards

Newsletters and Brochures

D-13 Watershed Watch Newsletters

Volume 1, February 1993
Volume 2, May 1993
Volume 3, Fall 1993
Volume 4, Spring 1994
Volume 5, Winter 1995
Volume 6, Fall 1996
Volume 7, Summer 1997 (to be completed)
Volume 8, Fall 1997 (to be completed)

D-14 Brochures

Coordinated Water Management: An Orientation to the Water System of the City and County of San Francisco

1 Material in this Appendix has been prepared exclusively for the Peninsula Watershed.

2 Material in this Appendix covers both the Peninsula and Alameda Watersheds, and therefore it is a common Appendix to both the Peninsula Watershed Management Plan and the Alameda Watershed Management Plan.

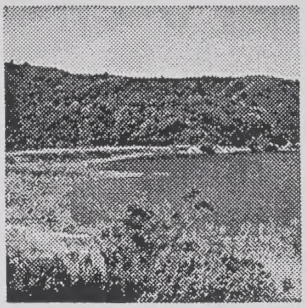
Chapter 1: Introduction

Chapter 1.0 Introduction

1.1 Purpose and Vision

Over 130 years ago the predecessor of the San Francisco Public Utilities Commission's (SFPUC)[1], Spring Valley Water Works, had a vision of protected watershed lands that would provide a pure and reliable water supply for the developing economy of San Francisco. In the last half of the 19th century, Spring Valley Water Works began purchasing the watershed lands that are now managed by the SFPUC. They first acquired the 23,000-acre San Francisco Peninsula Watershed and then the 40,000-acre Alameda Creek Watershed in the East Bay. Today, these two watersheds remain largely protected and continue to serve their primary purpose — to collect and store a reliable supply of high quality water for the homes and businesses in the San Francisco Bay Area.

The SFPUC's mission for managing the Peninsula and Alameda Watersheds is "to provide the best environment for the production, collection, and storage of the highest quality water for the City and County of San Francisco (CCSF) and suburban customers." The SFPUC seeks to accomplish this by "developing, implementing, and monitoring a resource management program which addresses all watershed activities." The watershed management program will "apply best management practices for the protection of water and natural resources and their conservation, enhancement, restoration, and maintenance while balancing financial costs and benefits" (SFPUC 1993). In response to this mission statement and because existing SFPUC policies do not address the management of watershed lands in a comprehensive or integrated manner, the Peninsula and Alameda Watershed Management Plans ("Plans") have been prepared.



San Andreas Reservoir

The purpose of the Plans is to provide a policy framework for the SFPUC to make consistent decisions about the activities, practices, and procedures that are appropriate on SFPUC watershed lands. To aid the SFPUC in their decision-making, the Plans provide a comprehensive set of goals, policies, and management actions which integrate all watershed resources and reflect the unique qualities of the watersheds.

In addition to serving as a long-term regulatory framework for decision-making by the SFPUC, the Plans are also intended to be used as watershed management implementation guides by the SFPUC's Land and Resource Management Section (LRMS) staff. The Plans provide the LRMS manager and staff with management actions designed to implement the established goals and policies for water quality, water supply, ecological and cultural resource protection, fire and safety

[1] Also commonly referred to as the San Francisco Water Department (SFWD).

Watershed Management Goals

Primary Goal

- Maintain and improve source water quality to protect public health and safety.

Secondary Goals

- Maximize water supply;
- Preserve and enhance the ecological and cultural resources of the watershed;
- Protect the watersheds, adjacent urban areas, and the public from fire and other hazards;
- Continue existing compatible uses and provide opportunities for potential compatible uses on watershed lands, including educational, recreational, and scientific uses;
- Provide a fiscal framework that balances financial resources, revenue-generating activities, and overall benefits, and an administrative framework that allows implementation of the Watershed Management Plans; and
- Enhance public awareness of water quality, water supply, conservation, and watershed protection issues.

management, watershed activities, public awareness, and revenue enhancement. The Plans also enable LRMS staff to address and plan for future management of issues such as fire management, erosion control, range management, public access, security, development encroachment, and ecological resource management.

The Plans stress the long-term balanced management of the watersheds and look beyond the immediate desires of the present generation to the needs of future generations. As the population of the Bay Area expands and water regulations become increasingly strict, future generations will be challenged to provide a clean and reliable water supply. Paramount to maintaining high quality water and protecting water supplies in the long term is control over watershed activities and preservation of watershed resources. The Plans recognize that to move toward a more balanced environment, all decisions regarding use of the watershed must be evaluated against the principles of natural resource conservation.

Furthermore, the Plans recognize that effective watershed management requires all of the watersheds' natural and man-made resources — vegetation, wildlife, soils, streams, cultural artifacts — to be managed as an integrated whole with each part interdependent upon the other. Integrated management ensures that the long-term function of the watersheds remains as maintaining high quality water.

In these Plans, the SFPUC has taken a restrictive approach to watershed management that considers water quality protection as the first and foremost goal. The primary goal is to:

- Maintain and improve source water quality to protect public health and safety.

In addition to the primary goal, the following secondary goals are also supported by the Plans' policies and management actions:

- Maximize water supply;
- Preserve and enhance the ecological and cultural resources of the watershed;
- Protect the watersheds, adjacent urban areas, and the public from fire and other hazards;
- Continue existing compatible uses and provide opportunities for potential compatible uses on watershed lands, including educational, recreational, and scientific uses;
- Provide a fiscal framework that balances financial resources, revenue-generating activities, and overall benefits, and an administrative framework that allows implementation of the Watershed Management Plans; and
- Enhance public awareness of water quality, water supply, conservation, and watershed protection issues.

The Alameda and Peninsula Watershed Management Plans are two separate

documents. However, Chapter 1 addresses both watersheds. Chapters 2 through 6 of this document deal specifically with the Peninsula Watershed.

1.2 Management Plan Organization

The Peninsula Watershed Management Plan ("Watershed Management Plan" or "Plan") consists of six chapters. This introductory chapter provides an overview of the Plan, its purpose, and organization. Chapter 1 also summarizes the history and organization of the SFPUC; describes the overall water system and the two watersheds; and describes the Peninsula Watershed Plan as it was approved and subsequently amended by the SFPUC.

Chapter 2: Existing Conditions and Resource Sensitivity provides an overview of the natural and man-made resources of the Peninsula Watershed, as well as a discussion of current watershed activities, infrastructure, adjacent land uses, and revenue generation.

Chapter 3: Watershed Management Issues summarizes the key public issues and management concerns that were identified during the planning process as critical to address in the Peninsula Watershed Management Plan.

Chapter 4: Watershed Management Goals and Policies identifies the primary and secondary watershed management goals established at the outset of the planning process. A set of watershed policies which address these goals are also established. These goals and policies, as well as the management actions in Chapter 5, provide the framework for implementation of the Peninsula Watershed Plan described in Section 1.6

Chapter 5: Watershed Management Actions and Guidelines defines the future of the Peninsula Watershed's land and water resources by establishing specific management actions and guidelines through which the goals and policies can be achieved. Together, Chapters 4 and 5 provide a framework for decision-making for future management of the Peninsula Watershed.

Chapter 6: Phasing and Implementation prioritizes and phases the management actions; assigns implementation responsibilities; and sets forth the Watershed Management Plan review and update process.

"The Plans look beyond the immediate desires of the present generation to the needs of future generations"

1.2.1 Appendices

In addition to the preparation of the Watershed Management Plan, several Plan Elements, reports, and technical memoranda were also developed to support the ongoing efforts of the planning process; these documents are Technical Appendices to the Plan and are available upon request from the SFPUC.

"Paramount to maintaining high quality water and protecting water supplies in the long term is control over watershed activities and preservation of watershed resources"

Material prepared exclusively for the Peninsula Watershed Management Plan includes the Watershed Natural and Cultural Resources study and geographic information system (GIS) maps, as well as three plan elements: the Fire Management Element, Southern Peninsula Watershed Golf Course Element, and Fifield/ Cahill Ridge Trail Management Element. These Plan Elements address certain management aspects of the Peninsula Watershed in greater detail and are described briefly below. Materials prepared for both Plans include several technical memoranda, the Watershed Sanitary Survey, and several planning process reports and newsletters.

1.2.2 Plan Elements

Fire Management Element

The Fire Management Element addresses the management of hazardous fuels (e.g., brush, grass, etc.) to reduce the risk of fire. The Element presents an integrated approach to fire management which considers impacts to water quality, water supply, and ecological resources. The Element also determines areas requiring fire management action; identifies recommended management techniques for these areas; and develops a day-to-day operations and maintenance plan for fire-related activities. Day-to-day operational recommendations include recommendations for criteria that trigger special precautions; actions to take under high fire danger; agreements to be made with local fire departments and agencies; and a pre-attack plan prepared in conjunction with California Department of Forestry and Fire Protection (CDF). Policies and management actions from this Element are incorporated into Chapters 4 and 5.

Southern Peninsula Watershed Golf Course Element

The Southern Peninsula Watershed Golf Course Element was prepared to address SFPUC Resolution No. 97-0059, which required consideration of a new golf course on the southern Peninsula Watershed. Inclusion of the golf course in the Peninsula Watershed Management Plan allows for evaluation of the programmatic environmental effects of the proposal in the Peninsula Watershed Management Plan Environmental Impact Report (EIR). An additional project-level EIR will be required on the golf course at a later time

The polices and actions set forth in this Element are intended to ensure that, if a golf course is constructed on the southern Peninsula Watershed, water quality, water supply, and ecological resources will not be compromised. The policies will not guide the SFPUC in making general decisions regarding the southern Peninsula Watershed golf course. The actions are intended for use by staff to implement the golf course policies established by the SFPUC. Policies and management actions from this Element are incorporated into Chapters 4 and 5, respectively.

Fifield/Cahill Ridge Trail Element

The Fifield/Cahill Ridge Trail Element was prepared in response to an SFPUC resolution which required including the possibility of a north–south trail bisecting the watershed. The Bay Area Ridge Trail Council (BARTC), a regional trails organization, has proposed such a trail as part of their proposed ridgeline trail which circles the San Francisco Bay. The BARTC's preferred route through the Peninsula Watershed follows Fifield/Cahill Ridge.

The Element describes three alternative projects to achieve public access along Fifield/Cahill Ridge. Inclusion of these three trail alignments in the Peninsula Watershed Management Plan allows for evaluation of the project-level environmental effects of these proposals in the Peninsula Watershed Management Plan EIR. The Trails Element is the only part of the Plan that will be analyzed at a project-level within the EIR. Alternative policies from this Element are incorporated into Chapter 4. The three alternative project descriptions, as well as a figure illustrating the trail routes, are incorporated into Chapter 5.

Historic Flumes

1.3 History and Organization of the San Francisco Public Utilities Commission

1.3.1 History

The SFPUC had two predecessors that were responsible for the construction of much of the extensive system of reservoirs, flumes, and pipelines that currently delivers water to 2.3 million Bay Area customers. Spring Valley Water Works (SVWW) began construction on San Francisco's water system in 1860 and continued until 1903, when ownership of the water system was transferred to the Spring Valley Water Company (SVWC). In 1930, the SFPUC was formed when SVWC was purchased by the City of San Francisco.

The development of a water supply for San Francisco began on the Peninsula Watershed in 1864, when the dam which impounds the waters of Pilarcitos Creek was completed. A system of flumes and pipes brought the water 32 miles to augment the City of San Francisco's supply from local wells and springs. San Andreas Dam and Reservoir were completed six years later in 1870. The Upper Crystal Springs Reservoir was formed after the construction of the Upper Crystal Springs Dam in 1877. The Lower Crystal Springs Reservoir was formed in 1890, following the development of Lower Crystal Springs Dam on San Mateo Creek below the confluence of its main branches.

The first purchases of land and water rights in the Alameda Creek Watershed occurred in 1875 with the acquisition of Calaveras Valley. SVWC began work in 1913 on Calaveras Dam, which created the Calaveras Reservoir. The Alameda Creek diversion dam and tunnel were completed in 1931 to divert Alameda Creek flows into Calaveras Reservoir. San Antonio Reservoir was completed in 1965.

The development of a water supply for San Francisco needed to extend beyond local watersheds of the San Francisco Bay Area to meet the demands of this growing metropolis. Between 1902 and 1913, the City of San Francisco attempted to obtain federal approvals to develop a water system in the Sierra Nevada Mountains. These efforts culminated in the passage of the Raker Act in 1913. This Act enabled the City of San Francisco to develop water and power facilities on federal park and forest lands. Work on the Hetch Hetchy Water and Power system began in 1914, and the first Hetch Hetchy water flowed into Crystal Springs Reservoir on October 24, 1934.

1.3.2 Organization

The SFPUC consists of five commissioners who are responsible for the major decisions relating to the 13 divisions and bureaus they oversee (Figure 1-1). The LRMS of the Water Supply and Treatment Division is responsible for watershed management on lands within the Bay Area.

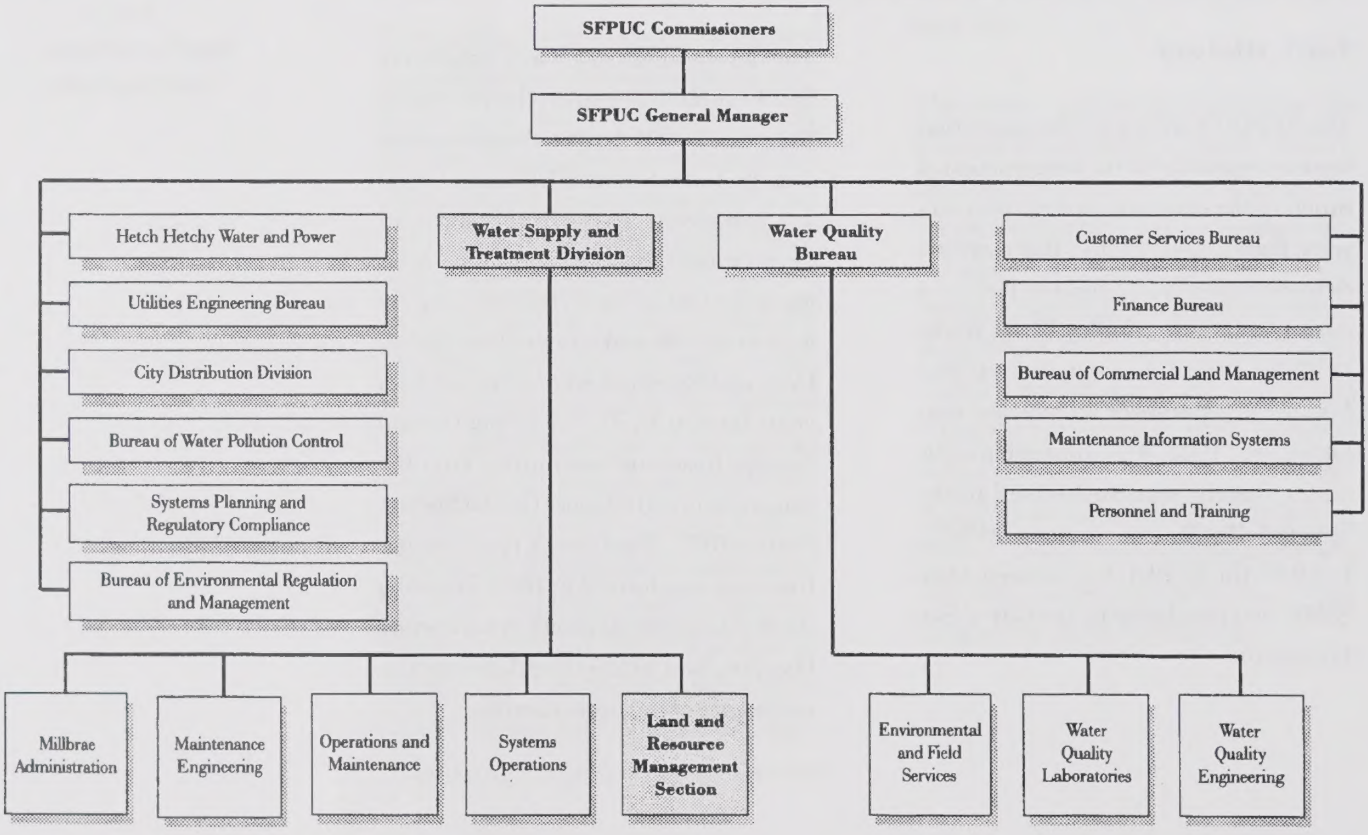


Figure 1-1 SFPUC Organization

Other divisions and bureaus that may be involved with watershed planning include the Bureau of Commercial Land Management, which is responsible for commercial leases and permits on SFPUC lands within the watersheds and rights-of-way (ROW) and the Water Quality Bureau. The Water Quality Bureau is responsible for water quality throughout the entire water system, including the Hetch Hetchy Water and Power system.

The Water Supply and Treatment Division is responsible for the operation and maintenance of storage, treatment, transmission, and distribution facilities from Alameda East Portal downstream to the San Francisco County line. Operations and maintenance beyond the county line are the responsibility of the City Distribution Division. The Water Supply and Treatment Division is divided into the following sections: Systems Operations, Operations and Maintenance, Maintenance Engineering, Millbrae Administration, and the LRMS. The discussion below highlights the LRMS.

Land and Resource Management Section

The primary function of the LRMS is management of the Peninsula and Alameda Watersheds. The members of LRMS are primarily natural resource specialists providing direction for watershed protection, planning, research, operations, and training. A land and resources manager, three urban foresters, a watershed forester, as well as two watershed keeper supervisors and 11 watershed keepers protect and manage the water, vegetation, wildlife, and soils of the watersheds. Their objectives are to protect water quality, reduce the risk of fire, protect reservoir storage capacity, create ecological reserves, maintain wildlife preserves, monitor wildlife, and conduct flood and erosion control. Two members of the LRMS are Registered Professional Foresters licensed by the State of California and fulfill the State's requirement for management of wildland resources and watersheds.

The LRMS is charged with developing watershed policy and project plans as well as specific technical studies such as hydrological and natural resource studies. The LRMS also oversees special projects related to land use activities within the watersheds. This group coordinates specific tasks with the Water Quality Bureau such as developing a water quality monitoring program and addressing hazardous materials issues. Watershed protection, operations, maintenance, restoration, improvement, and enhancement activities are planned, approved, and/or monitored by the LRMS. Day-to-day execution of these activities is performed by the Operations and Maintenance Section of the Water Supply and Treatment Division. In addition, the Bureau of Commercial Land Management staff administer land uses on watershed lands performed by lessees and other third party interests. Other SFPUC bureaus with which the LRMS coordinates include Systems Planning and Regulatory Compliance (SPARC), the Bureau of Environ-

mental and Regulatory Management (BERM), and the Utilities Engineering Bureau (UEB). SPARC conducts long range planning related to water resources. BERM is the SFPUC's central environmental management center responsible for overseeing EIRs, keeping track of legislation, and other environmental management responsibilities. UEB is responsible for engineering, design, and construction management of all SFPUC capital improvement projects.

The LRMS also coordinates with contractors, other utilities, public agencies, and private citizen groups to ensure that the watersheds are managed to protect water quality and watershed resources, and to create a better information base for watershed management.

The LRMS has seven Peninsula Watershed keepers and six Alameda Watershed keepers who are responsible for monitoring their assigned portions of the watersheds and providing immediate first-response to emergencies. The watershed keepers' primary function is to protect the watershed and thereby the water supply. Their duties include monitoring reservoir and stream levels and water quality, fire suppression, removing trespassers, assisting the public, monitoring the watersheds for road and other erosion damage, and checking system facilities immediately following an earthquake.

1.4 SFPUC Water System

1.4.1 Regional Location

The SFPUC's water system is located in central California and encompasses watersheds in the San Francisco Bay Area and the Sierra Nevada Mountains (Figure 1-2). The SFPUC's service area includes 2.3 million customers located in San Francisco, as well as in portions of San Mateo, Santa Clara, and Alameda Counties. An overview of the San Francisco water system as well as the two watersheds is provided below.

1.4.2 Water System Overview

The complete water system of the SFPUC obtains water from three sources: (1) Tuolumne River via the Hetch Hetchy Water and Power system in the Sierra Nevada mountains; (2) local runoff in the Calaveras Reservoir and San Antonio Reservoir watersheds in the greater Alameda Watershed; and (3) local runoff in the Crystal Springs, San Andreas, and Pilarcitos Reservoir watersheds within the greater Peninsula Watershed. In addition, San Francisco obtains some water from

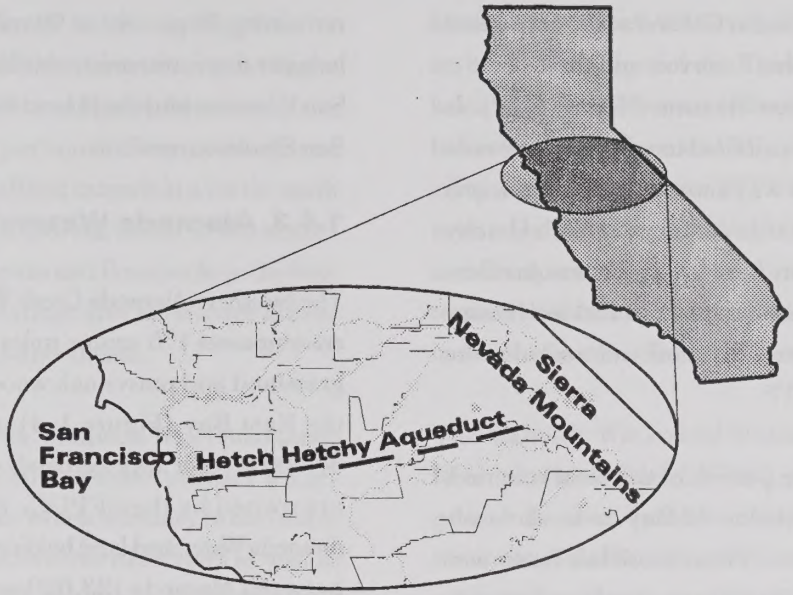


Figure 1-2 Regional Location

groundwater basins in San Francisco, Pleasanton, and the Sunol Valley. Approximately 85 percent of the potable supply to SFPUC customers is provided by the Hetch Hetchy Watershed. Runoff from the Peninsula and Alameda Watersheds contributes approximately 15 percent of the water supply. A diagram of the overall water system is presented in Figure 1-3.

There are ten reservoirs in the overall water system, with primary reservoirs in the Sierra Nevada Mountains, Alameda Watershed, and Peninsula Watershed. The three reservoirs in the Sierra Nevada feed the Hetch Hetchy Water and Power system. The Hetch Hetchy system delivers up to 300 million gallons daily to the San Francisco Bay Area. This water makes its 150-mile trip from the Sierra Nevada across the San Joaquin Valley to the Bay Area by gravity flow. For most of this distance, the water is enclosed in a series of tunnels and pipelines. In the Sunol Valley, the water enters the greater Bay Area portion of the system, shown in the left portion of Figure 1-3.

The greater Bay Area portion of the system includes the five primary reservoirs on the Peninsula and Alameda Watersheds and the 59,000 acres of watershed lands in Alameda, Santa Clara, and San Mateo Counties. These local water sources, which contribute approximately 15 percent to the water supply, are blended with Hetch Hetchy water.

A portion of water delivered from the Hetch Hetchy Water and Power system can be stored in the San Antonio Reservoir within the Alameda Watershed. This water may be combined with local run-

off collected in Calaveras Reservoir and San Antonio Reservoir and treated at the Sunol Water Treatment Plant (WTP). It is then distributed to wholesale customers on its way across the San Francisco Bay. Another portion of Hetch Hetchy water may be stored in Peninsula reservoirs where it can be blended with Peninsula Watershed runoff and treated at the Tracy WTP.

Sixty-five percent of this total volume is transmitted to 33 Bay Area wholesale customers. These wholesale customers serve 1,630,000 non-San Francisco residents in East Bay and South Bay communities and Peninsula cities. The remaining 35 percent or 90 million gallons per day is transmitted to the City of San Francisco and distributed to 770,000 San Francisco residents.

1.4.3 Alameda Watershed

The Southern Alameda Creek Watershed encompasses 175 square miles of rolling grassland and native oak woodlands in the East Bay (Figure 1-4), of which 36,000 acres or approximately one-third are owned by the SFPUC. SFPUC's Alameda Watershed land holdings are split between Alameda (23,000 acres) and Santa Clara (13,000 acres) Counties and contain two reservoirs — the San Anto-

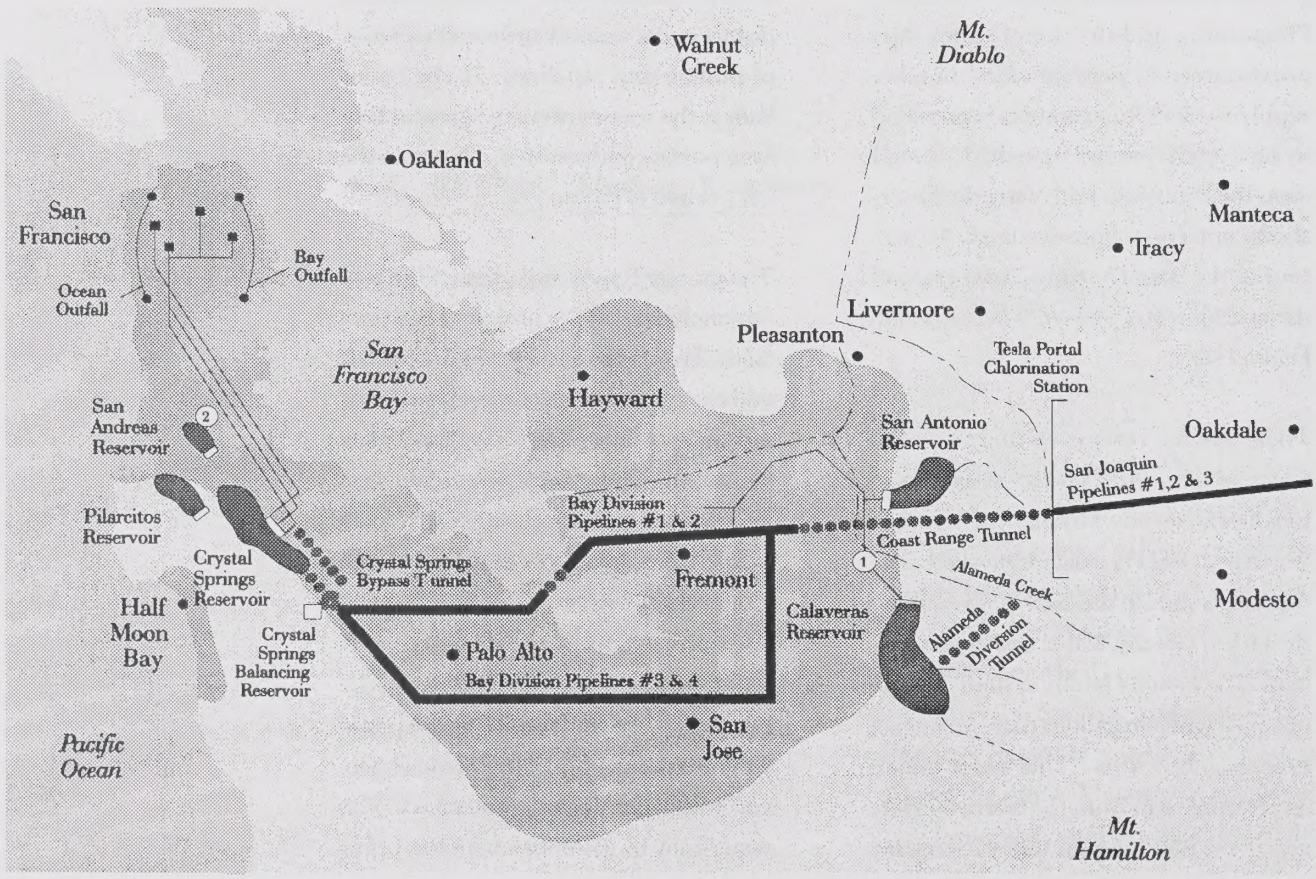
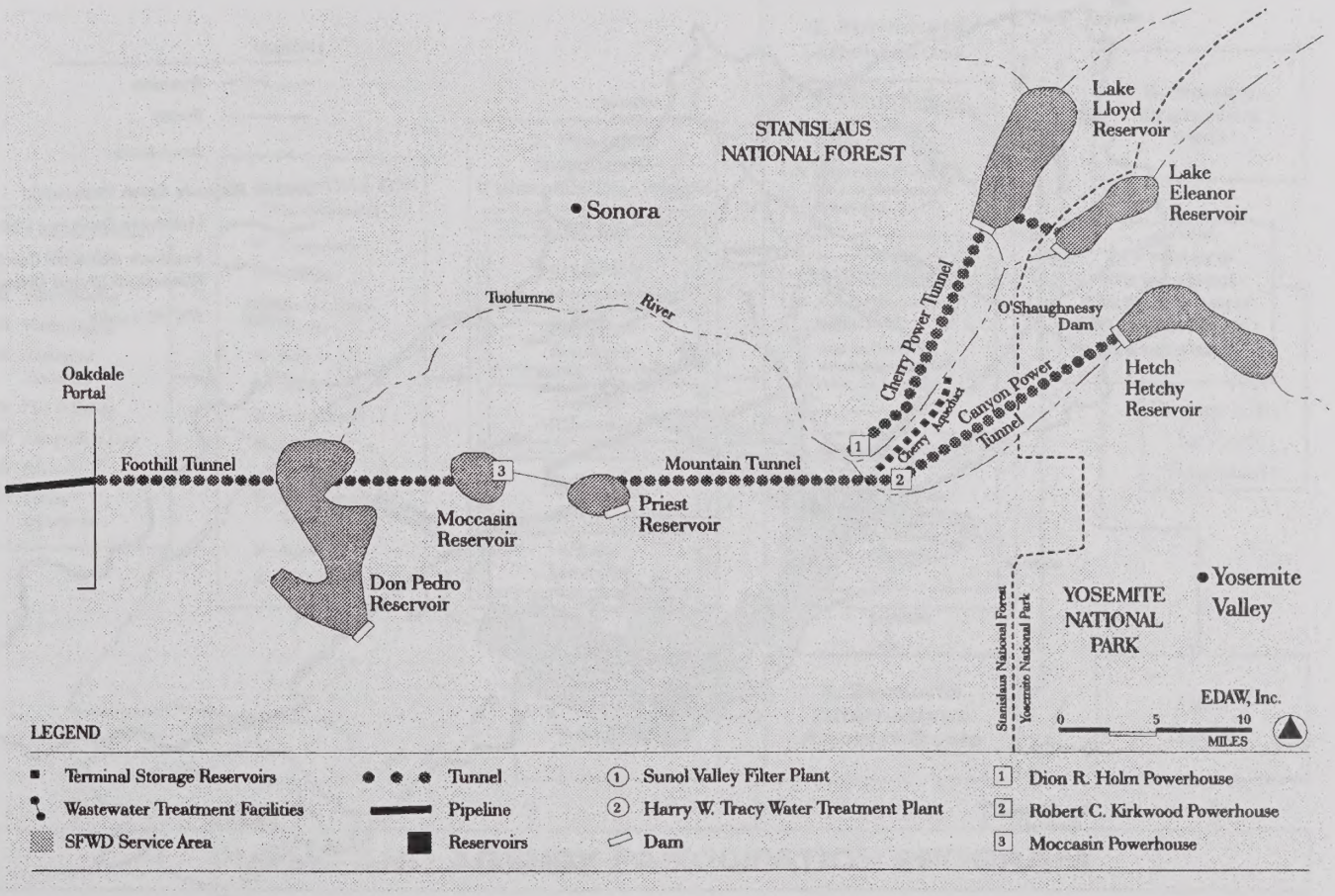


Figure 1-3 Overall SFPUC Water System

nio Reservoir to the north and the Calaveras Reservoir to the south. Highway I-680 and Route 84 meet in the northern portion of the watershed, and Calaveras Road extends in a north-south direction down the center of the watershed. Milpitas and Fremont lie to the west and Pleasanton and Livermore are located to the northeast.

The SFPUC Alameda Watershed lands include 30,000 acres of primary watershed, lands which tributary to San Antonio and Calaveras Reservoirs as well as lands which drain into Alameda Creek above the Fish Release and Recapture Facility. SFPUC Alameda Watershed lands also include 6,000 acres of secondary watershed (Figure 1-5). The latter are lands where runoff enters Alameda Creek below the Fish Release and Recapture Facility and does not enter SFPUC reservoirs or get recaptured at the Fish Release and Recapture Facility. The primary watershed lands are the most sensitive lands in terms of water quality protection.

The Alameda Watershed Management Plan, available from SFPUC, provides greater detail on the Alameda Watershed resources. The Plan also provides detailed actions for the management of the Alameda Watershed.



1.4.4 Peninsula Watershed

The Peninsula Watershed is a unique site within the greater Bay Area region. Due to its use for water collection and storage, it has been protected from the urbanization that has consumed much of the surrounding lands. The Peninsula Watershed hosts a variety of habitats and supports the highest concentration of rare, threatened, and endangered species in the entire nine-county Bay Area region. The watershed encompasses 23,000 acres of the San Francisco Peninsula. Virtually all of the hydrologic watershed is owned by the SFPUC (Figure 1-6).

The watershed is located in central San Mateo County and includes the San Andreas and Crystal Springs Reservoirs, adjacent to Highway 280, and the Pilarcitos Reservoir to the northwest. Land uses adjacent to the watershed are predominantly residential to the north and east and include the communities of San Bruno, Millbrae, Burlingame, Hillsboro, San Mateo, Belmont, San Carlos, Redwood City and Woodside, and unincorporated private open space to the west.

This Plan addresses the existing conditions and future management of the Peninsula Watershed.

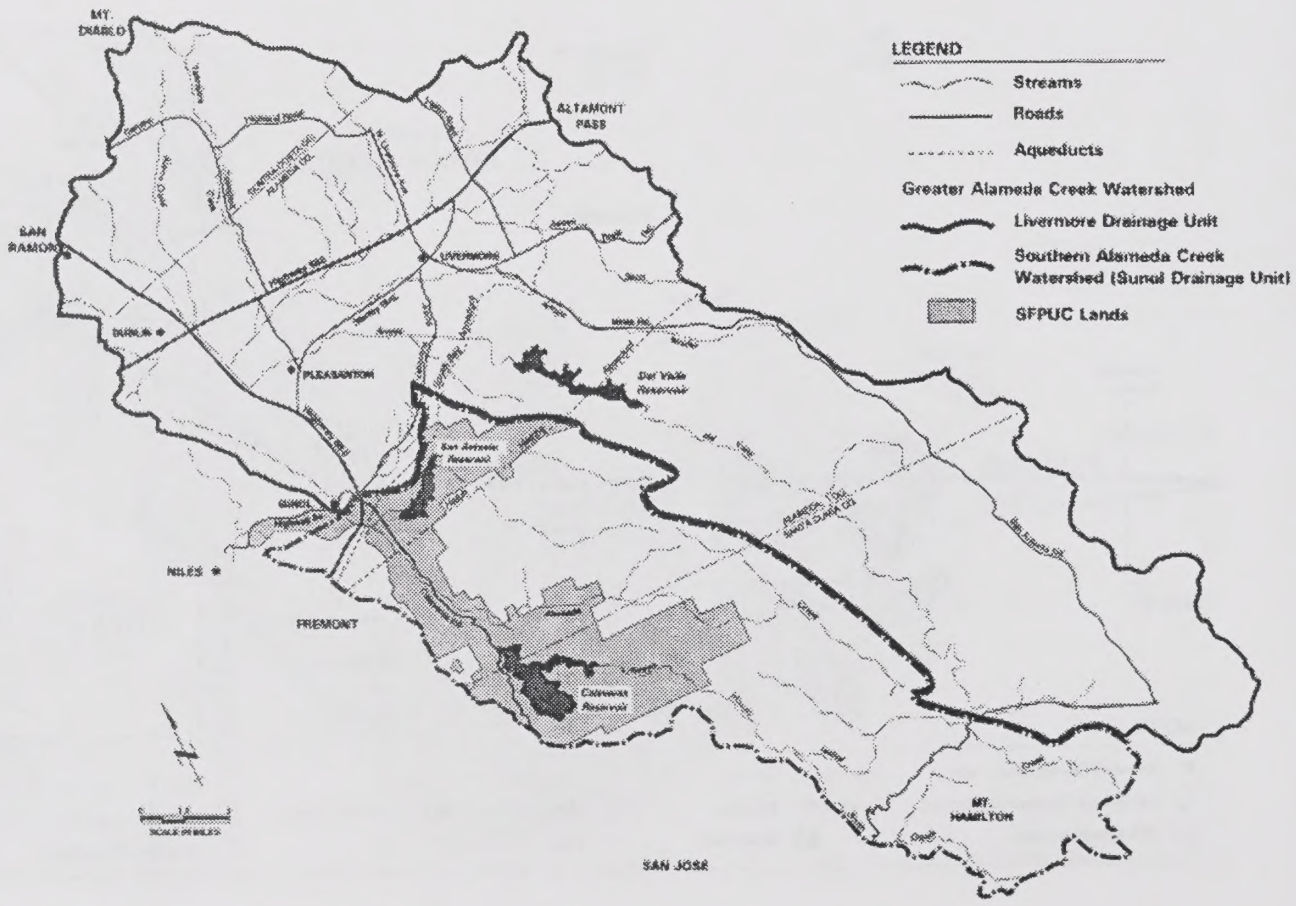


Figure 1-4 Southern Alameda Creek Watershed

1.5 Planning Process

The watershed management planning process commenced in August 1992 and has spanned five years. The process addressed planning for both the Peninsula and Alameda Watersheds simultaneously, allowing for similar goals and policies to be established for all of the SFPUC's local watershed lands. The process will culminate with the completion of the Peninsula and Alameda Watershed Management Plans, as well as the EIR that will evaluate the environmental impacts of the Plans in compliance with the California Environmental Quality Act (CEQA). Figure 1-7 illustrates the planning process, which consists of the seven stages described below, as well as an extensive, ongoing public and agency participation program.

1. Establish Goals

One primary and six secondary goals for watershed management were established at the outset of the project by the Watershed Planning Committee (WPC), a group of SFPUC division and department representatives who assisted the planning team in Plan development and review.

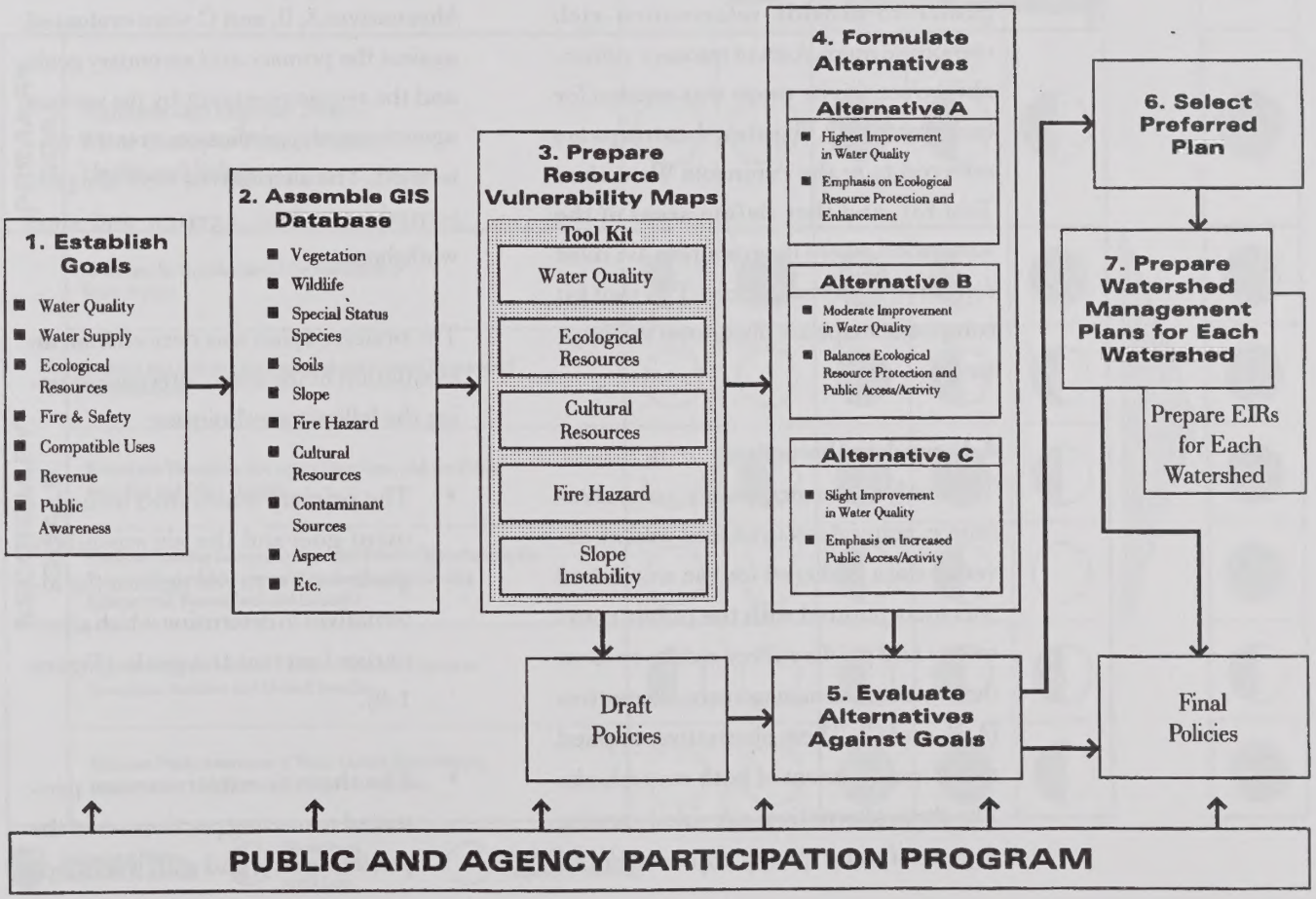


Figure 1-7 Planning Process

These goals were set forth in Section 1.1. These goals were used by the planning team throughout the planning process to provide direction for alternative and plan development. The goals serve as a foundation for the policies and management actions and will also serve as a basis for ongoing evaluation of Plan implementation.

2. Assemble Database and
3. Prepare Resource Vulnerability Maps
Mapping of watershed resource information was conducted on a GIS. Each resource type (e.g., vegetation, wildlife, etc.) was entered into the SFPUC GIS and became a separate map (or layer). Selected layers were then "sandwiched" together to provide information-rich composite maps. A set of resource vulnerability/sensitivity maps was created for each watershed. Together, these maps are referred to as the Peninsula Watershed Tool Kit, and they define areas of the watershed where the resources are most sensitive to disturbance. The tool kit composite maps are illustrated in Chapter 2.

4. Formulate Alternatives
The analysis of water quality, natural resource, cultural resource, and wildfire severity data gathered for the watershed was incorporated with the public comments and public survey results to form three watershed management alternatives (A, B, and C). These alternatives applied to the management of both watersheds. The three alternatives provided varying degrees of water quality improvement as well as a focus on either ecological resource protection or public access. Alternative A provided the highest improvement in water quality and emphasized ecological resource protection and enhancement. Alternative B provided a moderate improvement in water quality and provided a balance between ecological resource protection and public access and activity. Alternative C provided a slight improvement in water quality and emphasized increased public access and activity. Additional information on the alternatives is included in Appendix D-2, D-9, D-10, and D-13.

5. Evaluate Alternatives and
6. Select Preferred Plan
Alternatives A, B, and C were evaluated against the primary and secondary goals and the requirements set by the various agencies with jurisdiction over the watershed. The alternatives were also presented at public, agency, and staff workshops.

The preferred plan was derived from an evaluation of the three alternatives using the following techniques:

- The primary watershed management goal and the six secondary goals were arrayed against the alternatives to determine which alternative best met the goals. (Figure 1-8).

- The three alternatives were presented to meeting participants at the public, agency, and staff workshops

in June 1994. Each participant was asked to identify where they felt the SFPUC should manage watershed lands on a spectrum that ranged from closing the watersheds completely to opening the watersheds for unlimited access and activities. Alternatives A and C represent the reasonable outside limits of the alternatives, and Alternative B represents the midpoint between the two. In general, public opinion favored Alternative B. However, agency and staff opinion was split between Alternatives A and B.

As a result of the alternatives evaluation process, the Watershed Management Plan was formed and approved through a SFPUC resolution in January 1995. The preferred plan, as it was approved in January 1995, applied to both watersheds. Subsequent amendments to the Peninsula Watershed Management Plan include the Southern Peninsula Watershed Golf Course (March 1997) and the Fifield/ Cahill Ridge Trail Element (June 1997).

The preferred plan combines Alternative B with some components of Alternative A. The preferred plan strives to provide

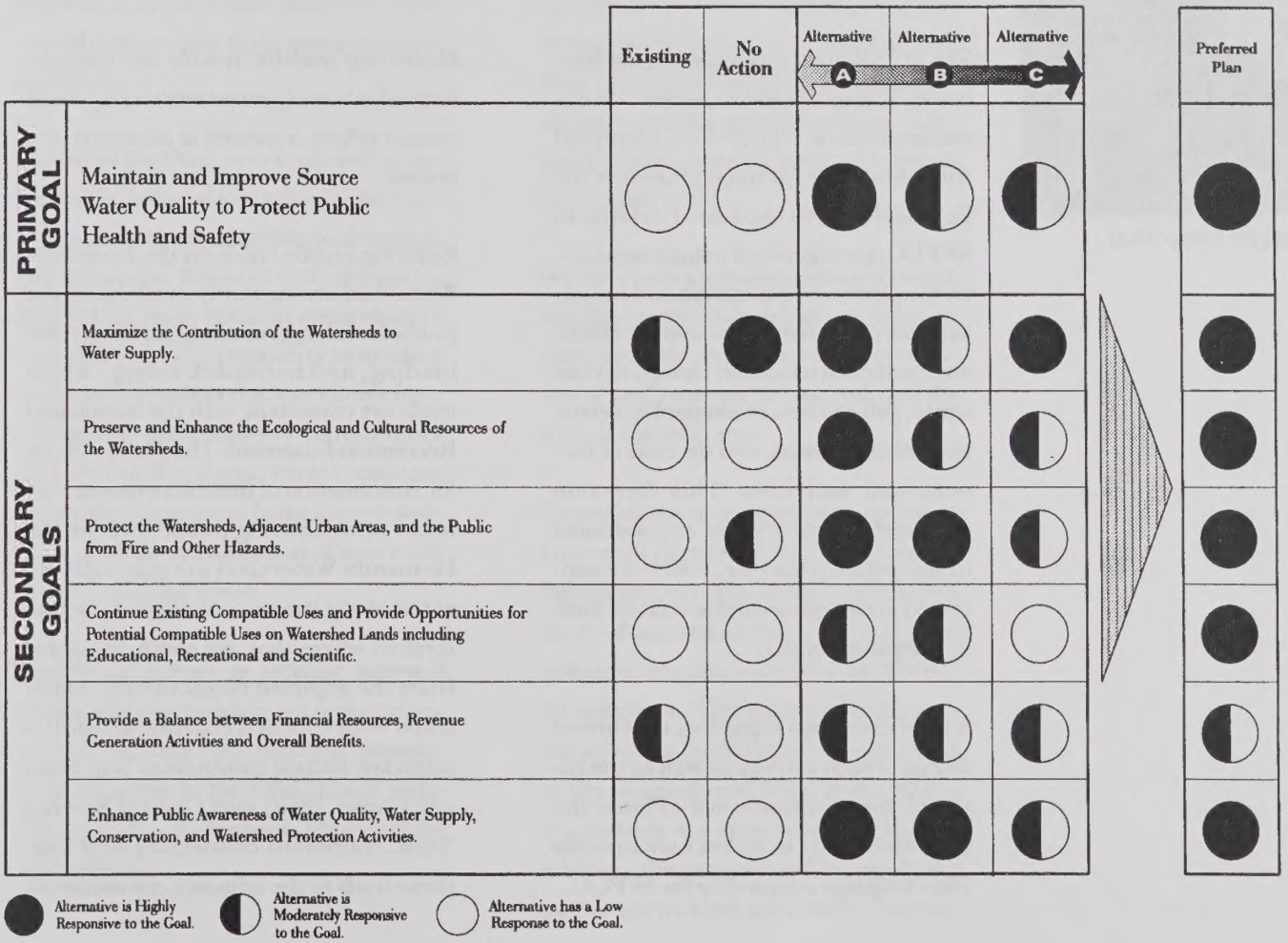
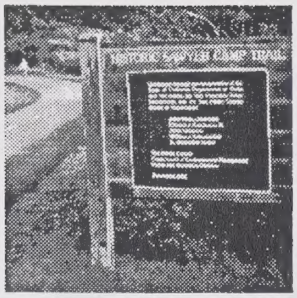


Figure 1-8 Comparative Evaluation of Alternatives

for better-than-moderate improvement in water quality and balances ecological resource protection with water supply needs, public access, and watershed activities.

7. Prepare Management Plans and EIRs. The general direction provided by the SFPUC on the preferred plan has been developed into two specific watershed management plans — The Peninsula Watershed Management Plan and the Alameda Watershed Management Plan. Each Plan provides polices for decision making and actions for day-to-day management which are specific to the character and resources of each watershed.

The environmental impacts of each Plan will be evaluated in an EIR, along with an evaluation of the other alternatives. The results of the EIR may necessitate revisions to the Plans or may require that mitigation measures be incorporated into the final Plans.



Sawyer Camp Trail

1.6 Peninsula Watershed Plan Description

The SFPUC direction regarding the Peninsula Watershed Management Plan is outlined below. The SFPUC identified their intentions for management of the Peninsula Watershed as it relates to SFPUC operations and management activities, trail use, equestrian and mountain bike use, fishing, scientific study, environmental education centers, day use areas, golf courses, incompatible activities, other activities, and the costs of recreational activities. This direction provided a framework for establishment of the details of the Plan, which are contained in the policies and actions set forth in Chapters 4 and 5.

A brief discussion regarding the current status of each activity as well as the rationale for its inclusion in the Plan is also provided. Text in italics indicates the Plan language adopted by the SFPUC.

Existing public trails *are open to individuals and groups without a permit except where a permit is currently required.*

Existing public trails on the Peninsula Watershed are currently available to the public for hiking, running, bicycling, roller blading, and horseback riding. These trails are consistent with the Scenic and Recreation Easement. The Plan provides for continuation of these activities as they occur now. Existing public trails on the Peninsula Watershed are generally located along the eastern edge of the watershed where they are easily accessible from the adjacent communities. Major trails which form a continuous north–south link include San Andreas Trail, Sawyer Camp Trail, and Crystal Springs Trail. Numerous connectors lead from these trails to the adjacent communities.

*Addition of **new trails** in zones of lesser vulnerability and risk is allowed.*

New trails adjacent to developed areas and SFPUC watershed boundaries and connections with urban areas and trail facilities of other agencies will be given priority. These trails will be open to individuals and groups without a permit.

Currently, SFPUC is working with San Mateo County to develop new trails on the eastern edge of the Peninsula Watershed within the Scenic and Recreation Easement. The intent is to complete a north-south connector through the watershed in areas of low sensitivity that would require very little construction of new trails.

As part of the Plan, new trails will be restricted to areas of low vulnerability and risk to protect water quality and ecological resources. Current trail demand is highest for short hikes in areas close to urban areas. The proximity to existing trails and developed areas allows for a connection with adjacent communities and their trail systems, while protecting watershed resources from disturbance caused by the construction of new trails in less accessible areas.

***Individual access to existing internal roads and fire roads** is not permitted under the Plan, with the exception of consideration of access to the Fifield/Cahill Ridge Service Road on the Peninsula Watershed (described below).*

Access to all other existing internal roads and fire roads is by permitted groups accompanied by volunteer leaders. Access to the interior parts of the watershed to unescorted individuals poses an extreme risk of fire as well as a higher risk of degradation of water quality and ecological resources.

Group Access by Permit

In June 1997, the SFPUC amended the watershed management preferred plan to include **consideration of access by individuals to the Fifield/Cahill Ridge Service Road** on the Peninsula Watershed. This action would permit individual access for hikers, equestrians, and mountain bikers. This action is addressed as Alternatives A and B in the Plan. Alternatives to individual access included in the Plan are Alternative C: Docent Led Access and Alternative D: Access by Annual Permit.

***Group access to existing internal roads and fire roads** is allowed with the following restrictions: the group must be led by a docent or staff; a permit is required; and the group is limited in size.*

Group access to internal and fire roads currently occurs on the watersheds. Hiking permits are currently granted to State-chartered groups with qualified volunteer leaders and between 10 and 25 members. This activity will be continued under the Plan as it allows access to the internal roads and trails on the watersheds in a supervised setting. In addition, this program will be expanded so that individuals may make reserva-

tions and be part of a group tour of the watershed without being a member of a chartered group.

***Equestrians** are not allowed except on designated existing and designated new public trails.*

Historically, equestrians have paid an annual fee and received a permit to ride on internal trails within the Peninsula Watershed. The Plan revokes these special privileges for equestrians and gives them the same rights as other watershed visitors (i.e., access to designated existing public trails, future additions to the existing public trail system, and new trails that will be open to the general public).

***Mountain biking** is allowed on designated existing and new trails only.*

Mountain biking is currently allowed on existing public trails within the Peninsula Watershed. Experiences of the Marin Municipal Water District and other agencies throughout the State and country have found that mountain biking is an extremely difficult sport to control, and a significant percentage of mountain bikers do not stay on designated trails resulting in problems such as unauthorized construction of new "outlaw" trails, and demands to open new single track trails. These activities contribute significantly to soil erosion and damage to natural resources. Also, conflicts between mountain bikers and other trail users (e.g., hikers, equestrians) often result. The Plan provides for the riding of mountain bikes on designated existing and new public trails only.

***Fishing** is not allowed.*

Fishing is not currently allowed on any of the watersheds' reservoirs because it would take place in one of the watershed's most sensitive areas — the water's edge. The water's edge is included in the High Water Quality Vulnerability Zone (WQVZ) and is extremely susceptible to erosion. Any substance that spills at the water's edge will find its way into the reservoir immediately.

***Scientific study** is allowed by permit only.*

Scientific study is currently allowed by permit only. The Plan continues this practice to increase the understanding of the watersheds' resources and biodiversity. Frequently, the findings of scientific study on the watersheds contribute to SFPUC's understanding and knowledge base of the watersheds, thereby adding value to the management of these lands. Using a computer-based GIS, SFPUC will be able to update their database with the results of any scientific studies on the watersheds. In addition, SFPUC will be able to add other features and planned modifications to the GIS and study the impacts of these modifications on the watershed environment.

*Consideration will be given to developing one **Environmental Education Center** on the watershed. The center would provide docent-led activities and other educational activities.*

*Designated picnic areas for **day use** only will also be considered.*

Currently, there are no visitor or educational centers on the watershed. Because the watershed provides tremendous educational opportunities, a day use environmental education center on the watershed is included in the Plan. This center could provide education for school groups and the general public regarding water quality and water quality protection, water supply and conservation, the watershed ecosystem, principles of a sustainable environment, and cultural resources. It could also provide a starting point for docent-led group hikes, an area for picnics, and an area for docent training.

*Existing **golf courses** will be retained and expansion of existing golf courses will be considered in low vulnerability/sensitivity areas. No new golf courses will be permitted with the exception of consideration of a golf course on the Southern Peninsula Watershed.*

There is currently one golf course on the Peninsula Watershed—the 18-hole Crystal Springs Golf Course. Because the natural condition of this land is already disturbed, the existing golf course will remain under the Plan. Nevertheless, it will be subject to strict monitoring requirements and other guidelines for water quality protection. Expansion of this existing course will only be allowed in low vulnerability/sensitivity areas.

The Plan will also consider a new golf course on the Southern Peninsula Watershed as requested by SFPUC Resolution No. 97-0069.

With the exception of the Southern Peninsula Watershed Golf Course, the Plan prohibits new golf courses on the remainder of the watershed because they require conversion of several hundreds acres of watershed land from a natural habitat to a man-made landscape and also require significant water consumption and the use of fertilizers, pesticides, and herbicides.

Only those activities designated by SFPUC as allowable will be permitted on watershed lands. ***Incompatible activities** include the following:*

- Unauthorized boating on existing reservoirs;
- Campgrounds;
- Camping;
- Unauthorized motorized vehicles;
- Water activities in existing reservoirs;
- Shooting ranges;
- Hang gliding;
- Off-trail use;
- Off-road use;
- Dogs except guide dogs;
- Unauthorized removal of watershed resources (plant materials, firewood, cultural resources);
- Release of domestic animals;
- Smoking;
- Littering;
- Alcohol;
- Unauthorized fires; and

- Hunting shall be allowed for animal control purposes only, by agreement with SFPUC.

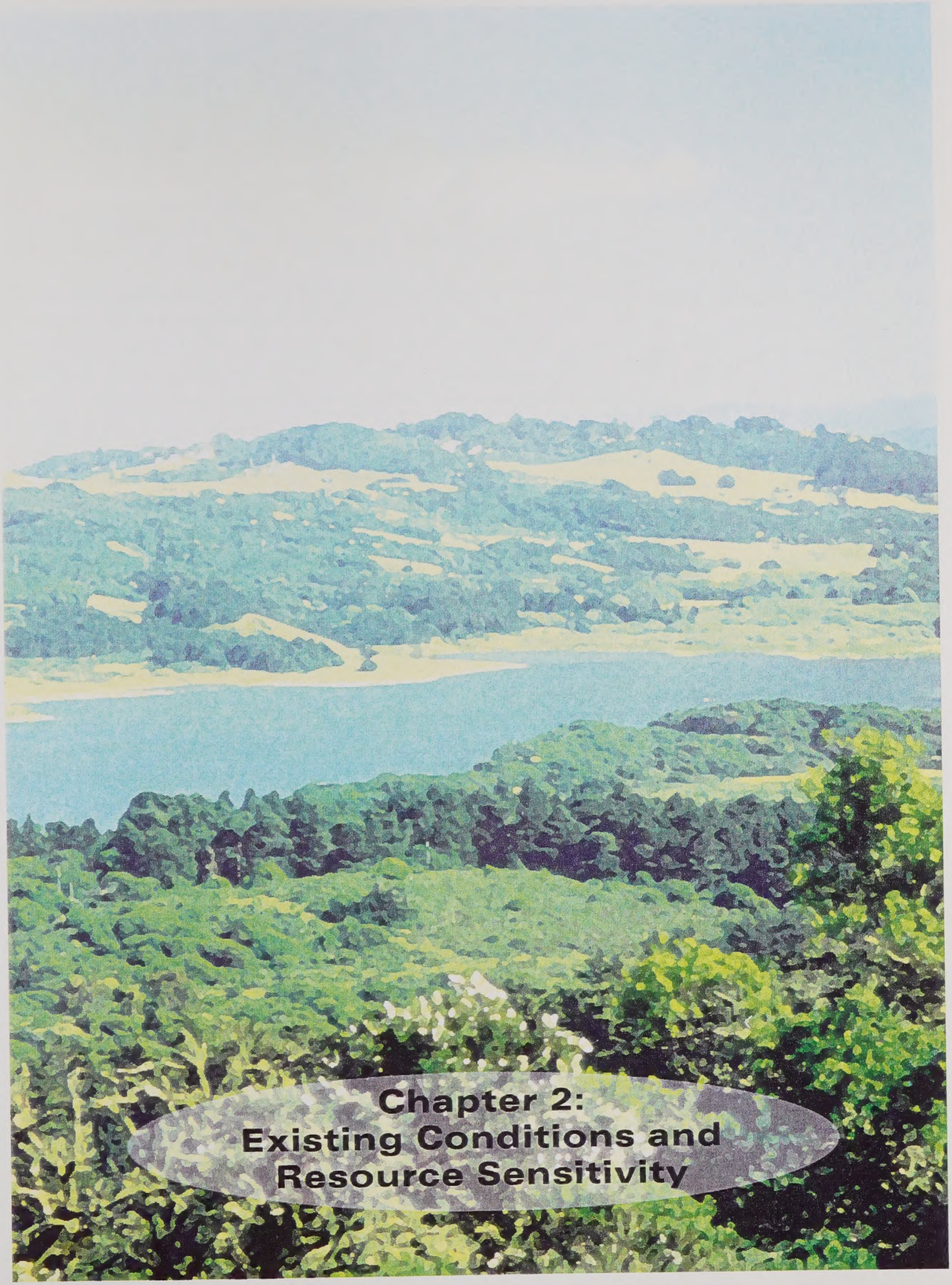
A number of existing regulations are in place prohibiting various activities on the watershed. These include regulations set forth by the State codes and regulatory agencies such as the Public Resources Code, California Department of Fish and Game (CDFG), CDF, and San Mateo County Parks Department (SMCPD) for public use areas managed under agreement with the SFPUC. In addition, the SFPUC currently prohibits a number of these activities on the watersheds. As part of the Plan, the activities listed above will be formally prohibited as they are considered in conflict with one or more of the watershed management goals. Existing regulations imposed by other agencies will also remain in force and are incorporated into the Watershed Management Plan.

Policies will be developed for ***additional compatible activities and uses****.*

The watershed activities identified above are those of the most concern to SFPUC and the public. The Watershed Management Plans also include policies and management actions for activities not discussed above.

The ***cost of providing recreational facilities*** *shall not be borne by water rate payers.*

SFPUC's primary responsibility is to provide high quality drinking water to its customers and rate payers; to maintain the facilities necessary for the transport, storage, and treatment of this water; and to conduct responsible natural resource management. During the January 1995 SFPUC hearing, the issue of payment for recreational activities and docents was discussed by the SFPUC Commissioners. In response to this issue, an additional motion was passed by the SFPUC stating that non-water related costs would not be borne by the rate payers.



Chapter 2: Existing Conditions and Resource Sensitivity

Chapter 2. Existing Conditions and Resource Sensitivity

2.1 Introduction

This chapter presents an overview of the existing conditions on the Peninsula Watershed as they relate to geology and soils, hydrology, water quality, vegetation, wildlife, fisheries, cultural resources, aesthetics, fire hazard, land status and adjacent uses, transportation and access, utilities, operations and maintenance, recreation, other watershed activities, and revenue generation. More detailed information on the existing conditions of the watershed is provided in the appendices.

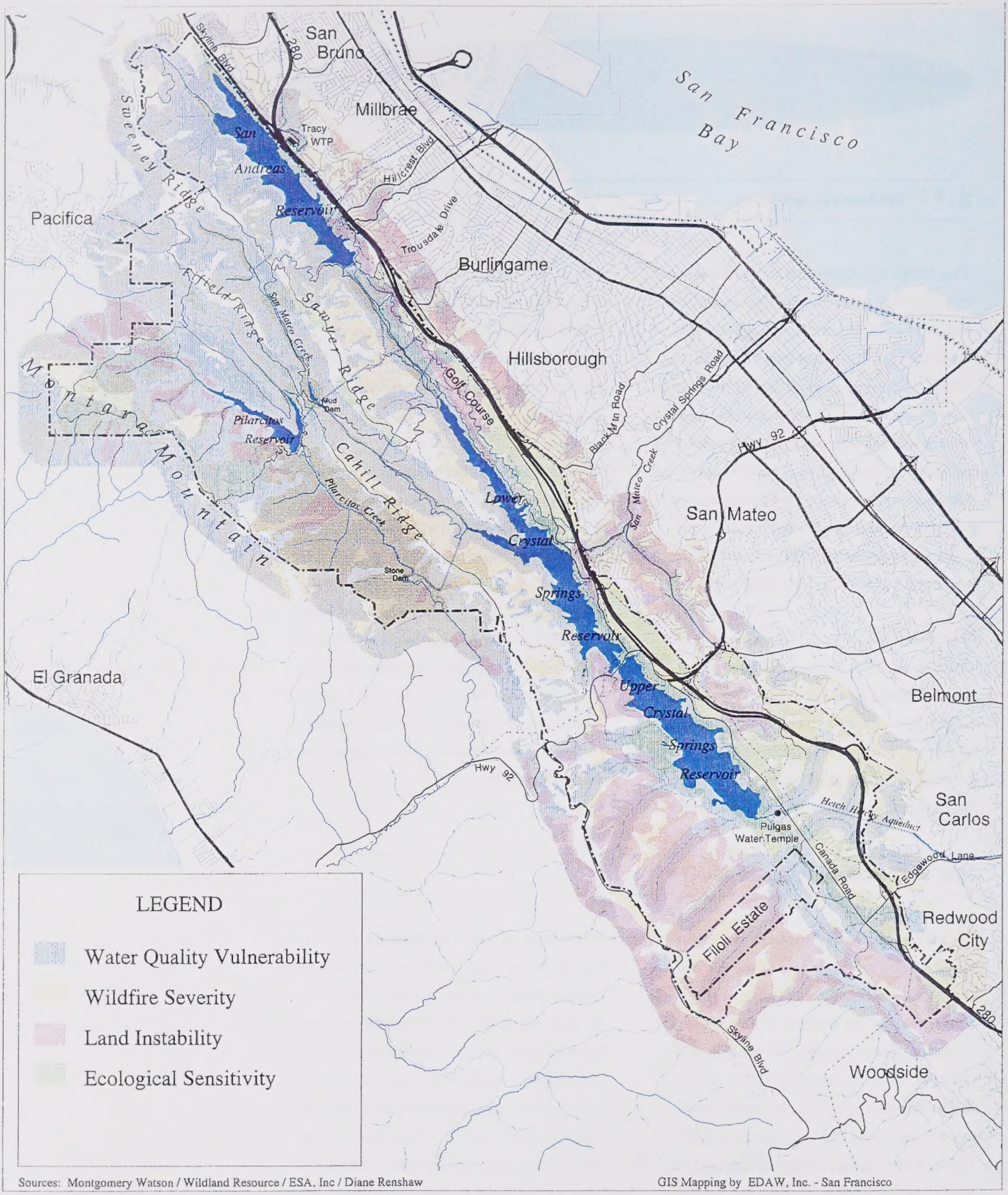
The sensitivity of each resource is also discussed in this chapter. Resource vulnerability and sensitivity zones were identified for water quality, ecological resources, cultural resources, soils and fire hazard, using a GIS. The set of GIS maps illustrating these zones comprise the "Peninsula Watershed Tool Kit" and serves as a basis for identifying those areas of the watershed that are most sensitive or vulnerable to disturbance and therefore least suitable for accommodating watershed activities.

The high vulnerability/sensitivity zones from each of the individual sensitivity maps were combined to create the Composite High Sensitivity Zones shown in Figure 2-1. The composite map illustrates that there are few places within the watershed that are completely free of resource vulnerability/sensitivity and many areas where two or more of the high resource sensitivity areas overlap, indicating vulnerability or sensitivity for multiple resources.

2.2 Geology and Soils

The Peninsula Watershed is within California's geologically complex and seismically active Coast Range, a region characterized by a series of northwest-trending faults, mountain ranges, and valleys. The topography of the watershed is dominated by the northwest-trending rift valley of the San Andreas fault. The northwestern portion of the watershed is marked by Montara Mountain, and the southwestern portion of the watershed occurs along Kings Mountain.

Numerous soil types throughout the Peninsula Watershed have erosion hazard ratings of severe and very severe. Over 45 percent of the soils with steep slopes have erosion hazard ratings of severe. Slopes in the northern portion of the watershed have average gradients ranging from about 3:1 to 1:1, while slopes in the southern portion of the watershed have average gradients ranging from about 5:1 to 3:1. The watershed is characterized by small landslides and moderate to



Sources: Montgomery Watson / Wildland Resource / ESA, Inc / Diane Renshaw

GIS Mapping by EDAW, Inc. - San Francisco

Feet 1000 0 2000 4000 6000

Meters 500 0 1000 2000

N

Original Scale 1 : 24,000

Figure 2-1 Composite High Sensitivity Zones

highly susceptible areas for landslides, with these areas occurring primarily in the northeast, northwest and southwest corners of the watershed.

The Erosion and Land Instability map, as shown in Figure 2-2, illustrates those portions of the watershed that are most sensitive to erosion and landslides. Erosion and land instability zones were established using data related to slope, soil erodibility, and historic landslide activity. Refer to Appendix C-4 for a discussion of the sediment yields of the watershed.

2.3 Hydrology

Due to its proximity to the Pacific Ocean, the Peninsula Watershed is strongly influenced by a coastal climate, with ocean fog particularly persistent along the ridgelines in the northern half of the watershed. Precipitation within the 23,000-acre watershed drains into the San Mateo, Pilarcitos, and San Andreas Creeks. These creeks feed the three reservoirs which store water within the watershed: Crystal Springs Reservoir, San Andreas Reservoir, and Pilarcitos Reservoir. Runoff within the Peninsula Watershed provides five to ten percent of the water system's total supply.

The catchment area for the Crystal Springs Reservoir is 22.5 square-miles, and the reservoir storage area has a maximum capacity of 58,400 acre-feet. The catchment area for the Pilarcitos Reservoir is 3.8 square-miles, with a reservoir storage area of 3,100 acre-feet at maximum capacity. The San Andreas Reservoir catchment area is 4.4 square-miles and has a storage area with maximum capacity of 19,000 acre-feet. For further information on the San Francisco Water System facilities and practices, refer to Appendix C-2.

2.4 Water Quality

The quality of SFPUC water varies according to the source (e.g., imported vs. local surface runoff), storage, and treatment of the water. The Peninsula Watershed reservoirs (Crystal Springs, San Andreas, and Pilarcitos) store water from the Alameda Watershed, the Hetch Hetchy Water and Power system, and local runoff. This water is treated and filtered at the Harry Tracy WTP.

Giardia lamblia and *Cryptosporidium* were not detected in eight samples collected from Upper and Lower Crystal Springs Reservoir during 1997. Of 22 samples collected from Pilarcitos and San Andreas Reservoirs during 1997, *Giardia* cysts were measured in four samples ranging from 1.0-9.2 cysts per 100 liters, and *Cryptosporidium* oocysts were detected in two samples at 1.0 oocysts per 100

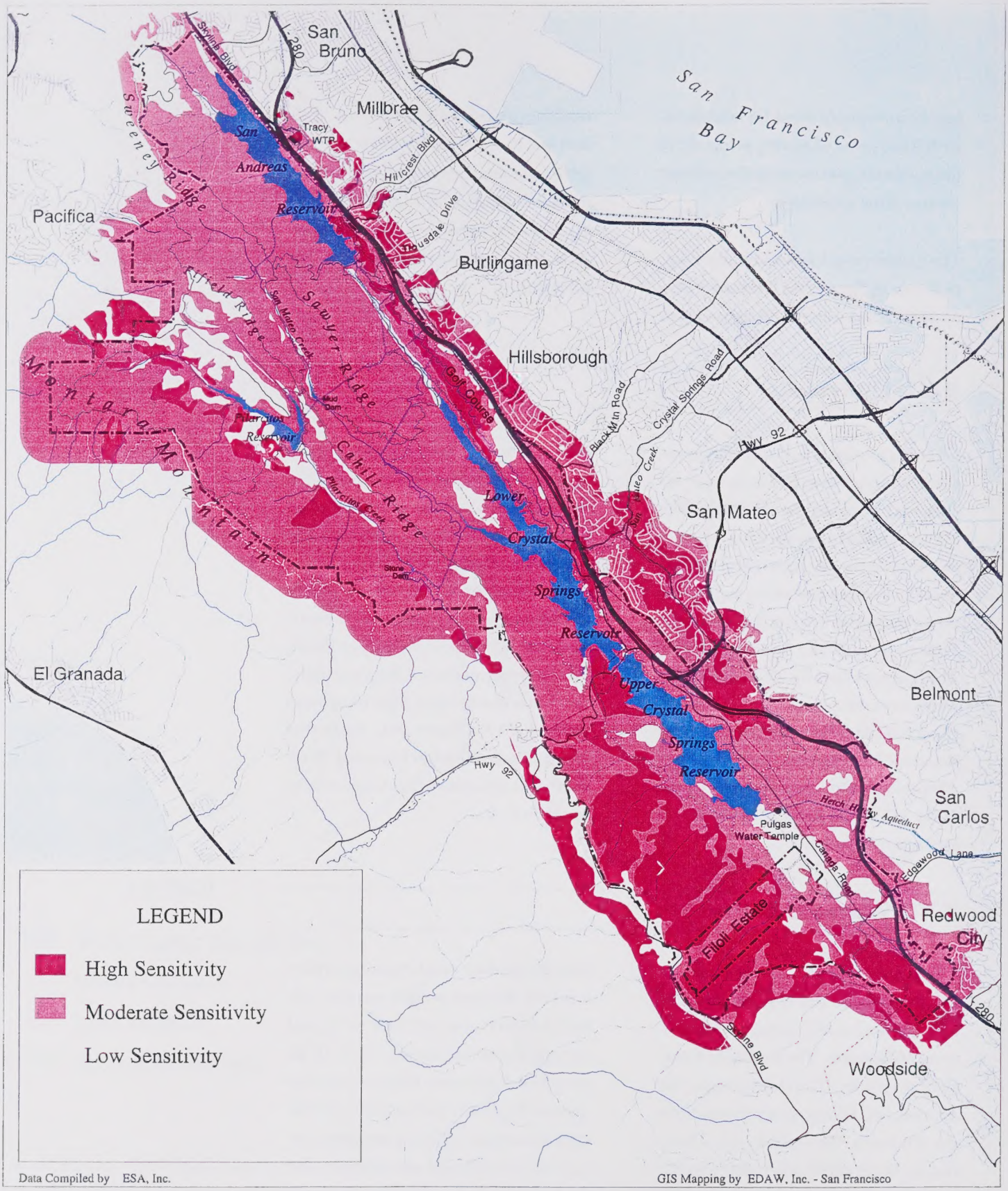


Figure 2-2 Erosion and Land Instability

liters. More than 95 percent of the total coliform tests throughout the distribution system were negative, complying with the Total Coliform Rule. Raw water samples from Upper Crystal Springs, Lower Crystal Springs, and San Andreas Reservoirs had color readings that exceeded the treated water secondary maximum contaminant levels (SMCL). Pilarcitos Reservoir had elevated levels of iron and manganese, exceeding the treated water SMCL for these parameters. Crystal Springs and Pilarcitos Reservoirs exhibit stratification and anoxic conditions in late summer and fall. San Andreas Reservoir remains well-mixed, and consequently the water quality of this reservoir is more consistent.

WQVZs are those areas where activities or disturbance have the greatest potential to impact the water quality of primarily local surface runoff but also total water supplies stored in the reservoirs. WQVZs were developed using the following key criteria: proximity to water varied by intensity of rainfall, wildlife concentration areas, vegetation as a protective layer, slope, and soil (as a composite of five soil characteristic parameters). The Composite WQVZ map, shown in Figure 2-3, illustrates those watershed areas with high, moderate, and low vulnerability. Disturbance to areas of the highest vulnerability would result in the greatest risk to water quality. The figure indicates there are very few areas of low vulnerability and large areas of high vulnerability, indicating that activities in most locations on the watershed are likely to have an impact on water quality. Refer to Appendix C-3 for a discussion of Water Quality Vulnerability Zone Development.

2.5 Vegetation

The watershed has remained comparatively undisturbed by surrounding urban development. Consequently, it serves as an important biological preserve for the region. Due to the diversity of climate, topography, geology, and soils, a wide variety of vegetation exists on the Watershed. These include Douglas fir forests; serpentine grasslands, dominated by native bunch grass; areas of coastal scrub and chaparral; riparian corridors; and wetlands.

Twenty natural community/cover types occur within the watershed, as illustrated in Figure 2-4. Most of the watershed is well-vegetated with woodland and scrubland and a small amount of grassland. Serpentine grassland and valley needlegrass grassland occur on the gently undulating terraces on Buri Buri Ridge and on the broad flat ridges; nonnative grasslands occur on soils that are moist or even waterlogged during the winter rainy season and dry and hard during the late spring and summer. Scrub and chaparral communities are found on the dry, rocky slopes and ridge tops. Mixed evergreen forest/coast live oak woodland favor slopes at higher eleva-

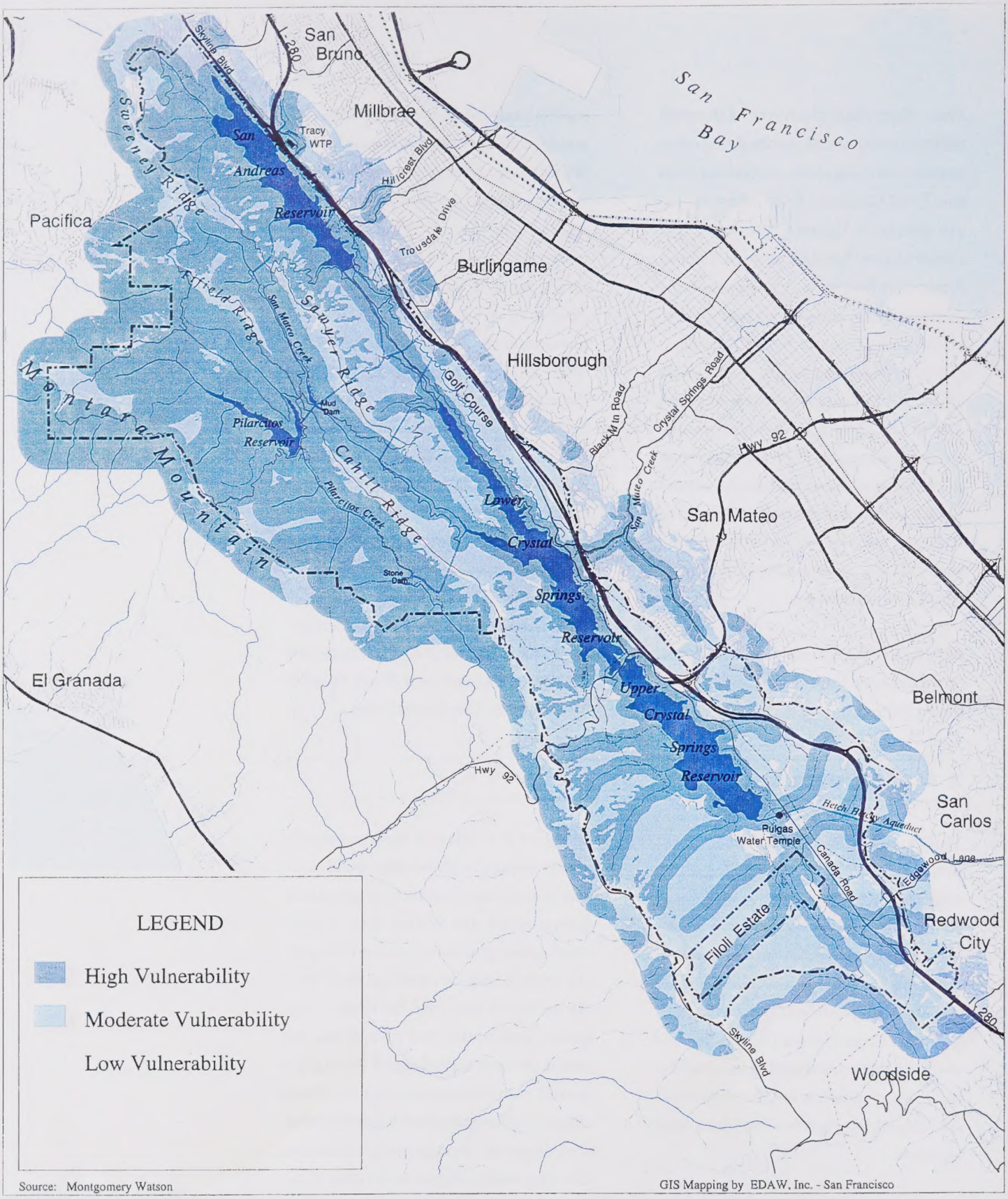
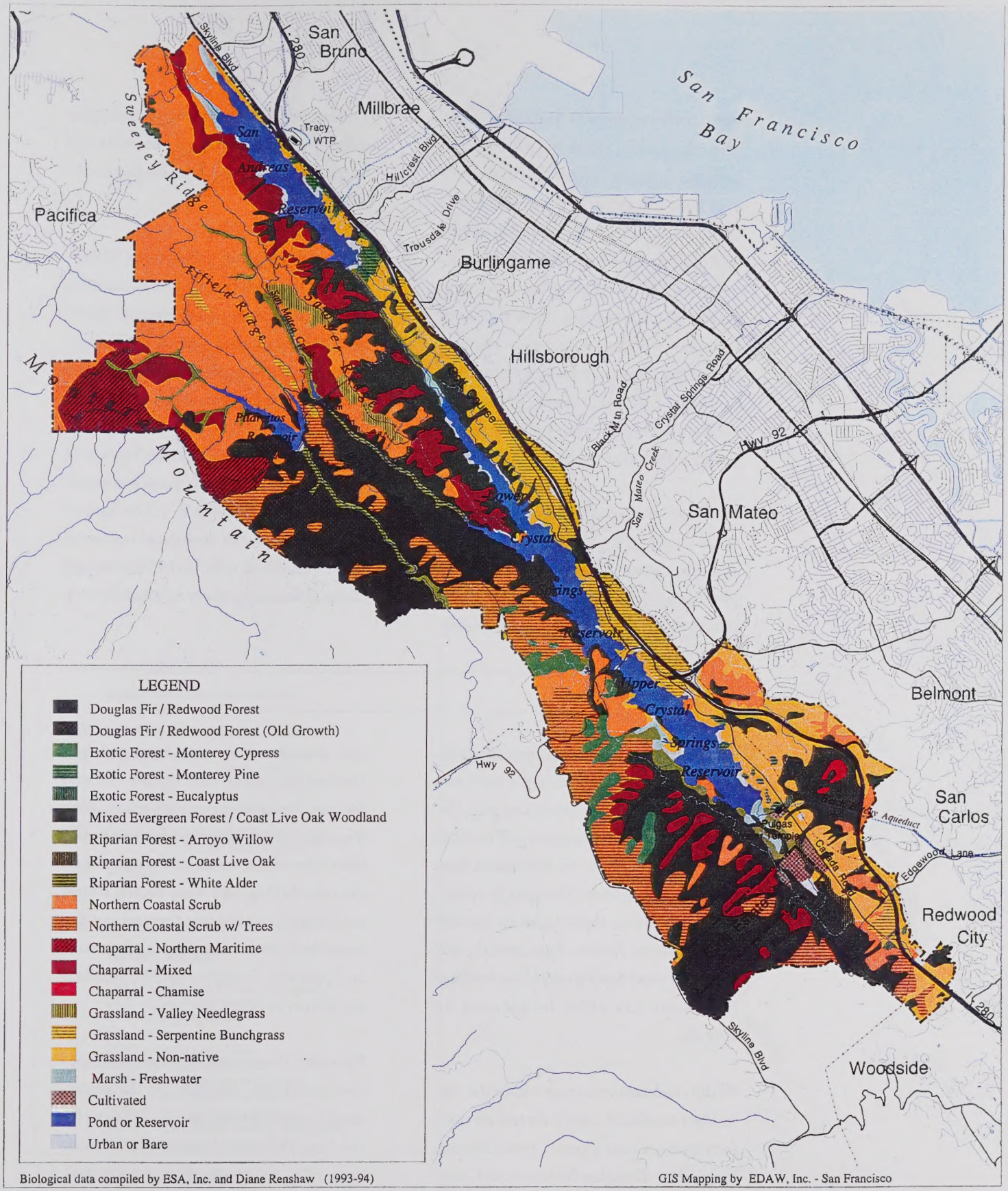


Figure 2-3 Composite Water Quality Vulnerability Zones

Original Scale 1 : 24,000



Biological data compiled by ESA, Inc. and Diane Renshaw (1993-94)

GIS Mapping by EDAW, Inc. - San Francisco

Feet 1000 0 2000 4000 6000

Meters 500 0 1000 2000

N

Original Scale 1 : 24,000

Figure 2-4 Vegetation Communities

tions, such as occurs at the southern end of the watershed above the Filoli Estate. Douglas fir forest is found on the north-east-facing slopes above San Mateo and Pilarcitos Creeks and in small amounts on Cahill Ridge. Non-native trees making up the Exotic Forest are located in scattered areas within the Watershed. Riparian woodland occurs in moister drainages, especially along Pilarcitos Creek and San Mateo Creek. Coastal and valley freshwater marsh occur where streams discharge to the reservoirs.

A natural fire regime has been absent from the watershed for the past century. In addition, the watershed was grazed in the 19th century. These two factors have created the vegetation mosaic visible today. This mosaic would likely be considerably different had grazing not occurred and naturally occurring fires had been allowed to burn.

Several vegetation types in the Watershed are considered endangered, sensitive or rare under state and/or county regulations because of their limited distribution either locally or regionally. Eight highly sensitive communities are shown in Figure 2-5. In addition, Figure 2-5 identifies 11 special status plants known to occur on the watershed; these plant species are listed in Table 2-1. For further information on the ecological resources of the watershed, refer to the Natural and Cultural Resources study in Appendix A-4.

2.6 Wildlife

The watershed provides important wildlife habitat in the region and is used as a travel corridor and stopover along the Pacific Flyway. The majority of habitat lies west of the reservoirs and ranges from grasslands to mature Douglas fir forest. Species utilizing these habitats include many raptors, herons, bats, snakes, and frogs. Crystal Springs and San Andreas Reservoirs are often frequented by seagulls.

Wildlife habitats occurring within the watershed consist of: exotic forests on east-facing slopes near Upper Crystal Springs Reservoir; Douglas fir forest on Cahill Ridge, Pilarcitos Canyon, and Pilarcitos Reservoir; mixed evergreen forest/coastal oak woodland on east-facing slopes above the Lower and Upper Crystal Springs Reservoir; riparian areas along the edges of the lakes and reservoirs and their tributaries; scrub and chaparral on the east-facing and west-facing slopes and ridges; grasslands throughout the watershed; and isolated wetlands, ponds, and pasture. Sensitive wildlife habitats are shown in Figure 2-6.

Nine rare, threatened, or endangered species have been identified on the watershed, including three species of butterfly, the San Francisco garter snake, red-legged frog, and western pond turtle. Figure 2-6, Sensitive Wildlife Habitats and Species, indicates reported locations of

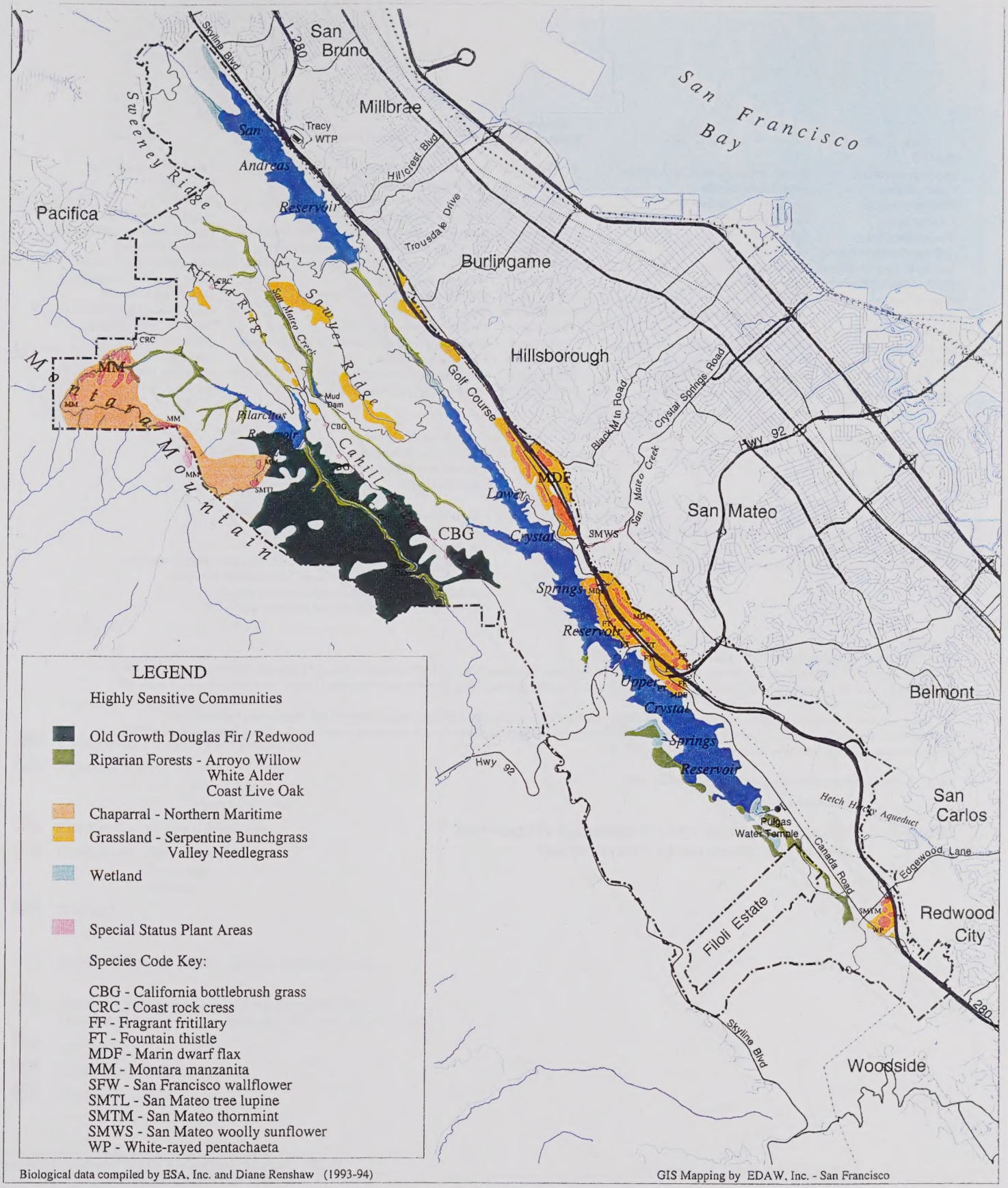


Figure 2-5 Sensitive Vegetation Communities & Species Original Scale 1 : 24,000

Common Name	Scientific Name	Status/a,d/ Fed/State/CNPS	Natural Community	Comments
PLANTS				
San Mateo thornmint	*Acanthamintha [obovata ssp.] duttonii*	FE/SE/List 1B	Serpentine Bunchgrass	Found on "Triangle" /a,c/
Coast rock cress	*Arabis blepharophylla*	FC3c/S-/List 4	Coastal Scrub, Sandstone Outcrops	Found /c,f/
Montara manzanita	*Arctostaphylos montaraensis*	FC2/S-/List 1B	Northern Maritime Chaparral	Found /a,c/
Fountain thistle	*Cirsium fontinale var. fontinale*	FPE/SE/List 1B	Serpentine Bunchgrass	Found on Pulgas Ridge /c/
Western leatherwood	*Dirca occidentalis*	F-/S-/List 4	Mixed Evergreen Forest/Coast Live Oak Woodland	Found in many communities /b/
California bottlebrush grass	*Elymus californicus*	FC2/S-/List 4	Douglas Fir Forest/Upland Redwood Forest	On Cahill Ridge /c,f/
San Mateo Woolly sunflower	*Eriophyllum latilobum*	FPE/S-/List 1B	Mixed Evergreen Forest/Coast Live Oak Woodland	Along Crystal Sps.Rd. /a,c,e/
San Francisco wallflower	*Erysimum franciscanum*	FC2/S-/List 4	Serpentine Bunchgrass	Found throughout grassland /c/
Fragrant fritillary	*Fritillaria liliacea*	FC2/S-/List 1B	Coastal Scrub, Serpentine Bunchgrass	Found Pulgas Ridge /c/
Marin dwarf flax	*Hesperolinon congestum*	FPE/S-/List 1B	Serpentine Bunchgrass	Found Pulgas Rdg.BuriBuri /c/
San Mateo tree lupine	*Lupinus eximius*	FC2/S-/List 3	Northern Maritime Chaparral	Found /c/ Taxon changed
Arcuate bush mallow	*Malacothamnus fasciculatus var. arcuatus*	F-/S-/List 4	Mixed Evergreen Forest/Coast Live Oak Woodland	Oberlander 1953
White-rayed pentachaeta	*Pentachaeta bellidiflora*	FPE/S-/List 1B	Serpentine Bunchgrass	Found /a,c/
San Francisco owl's clover	*Triphysaria [Orthocarpus] floribunda*	FC2/S-/List 1B	Valley Needlegrass Grassland, Non-native Grassland	Oberlander 1953
San Francisco campion	*Silene verecunda ssp. verecunda*	FC2/S-/List 1B	Coasta Scrub, Sandstone Outcrops	Not found /c/

KEY:

Federal Listing Categories
U.S. Fish & Wildlife Service
FE=Federal Endangered
FT=Federal Threatened
FC1=Candidate info. indicates listing may be appropriate, data on file at present time.
FC2=Candidate info. indicates listing may be appropriate, supporting data not on file.
FC3a=Non-candidate; previously candidate but now believed extinct.
FC3b=Non-candidate; previously candidate but now considered an invalid taxon.
FC3c=Non-candidate; previously a candidate but now not threatened.

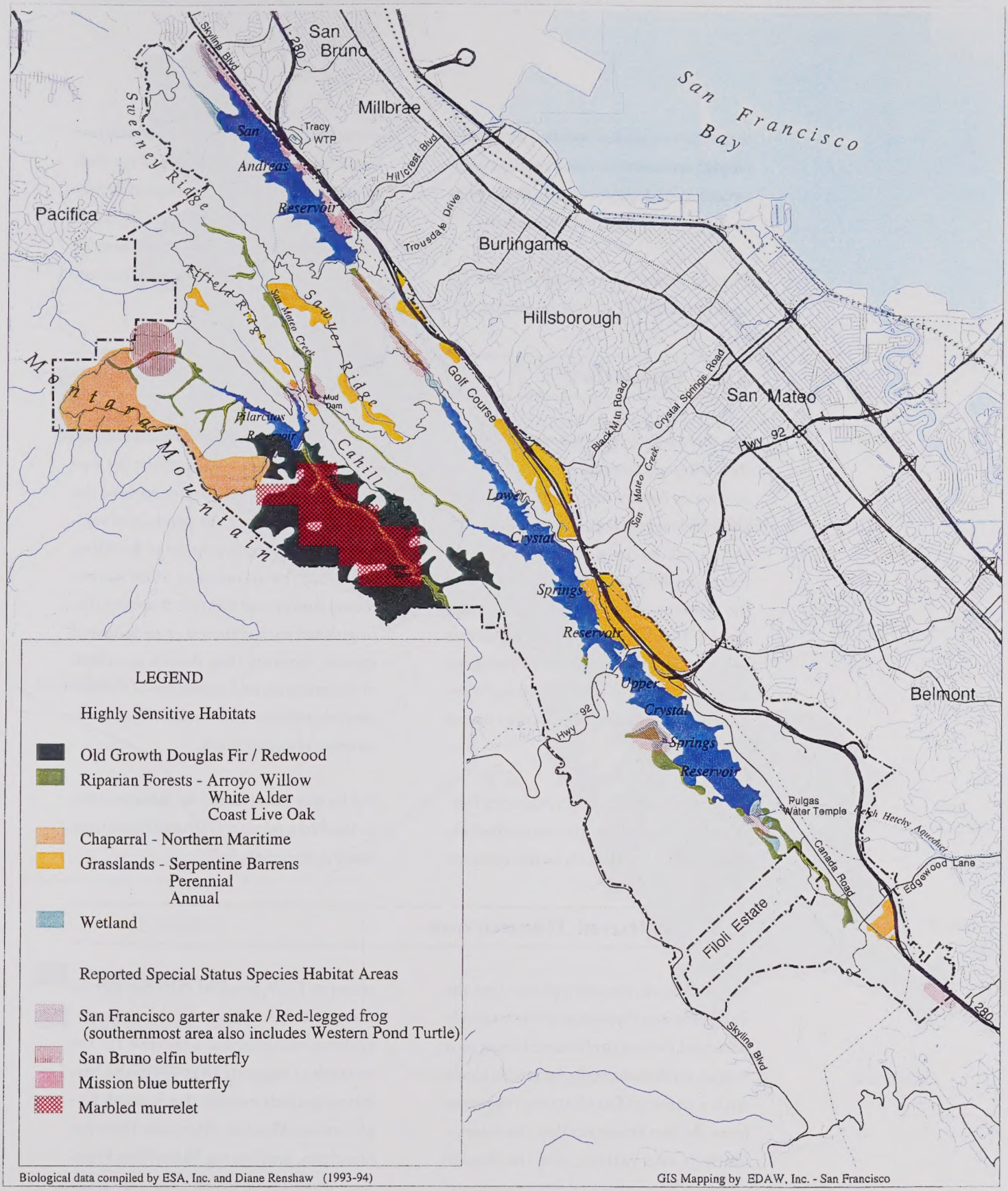
State Listing Categories
CE=California Endangered
CT=California Threatened
CR=California Rare

Private Sector Interest Groups
California Native Plant Society (CNPS) Lists
List 1A=Plants presumed extince in California
List 1B=Plants rare and endangered in California, more common elsewhere
List 2=Plants endangered in California, more common elsewhere
List 3=Plants about which more information is needed
List 4=Plants of limited distribution (a "watch list")

References:
/a/ CNDDB Rarefind printout Special Plant Element List, August 1991.
/b/ Oberlander, G. T., The Taxonomy and Ecology of the Flora of the San Francisco Watershed Reserve, PhD Dissertation, Stanford University, Stanford, California, 1953.
/c/ Corelli, T., Rare Plant Populations and Associated Natural Communities of the San Francisco Watershed Peninsula Watershed Lands: 1991 Survey Report, Prepared for The Nature Conservancy, San Francisco, 1991.
/d/ Smith, J. P. and K. Berg (eds.), Inventory of Rare and Endangered Vascular Plants of California, California Native Plant Society, Sacramento, California, 1991.
/e/ The Nature Conservancy, Rare Species Found on the San Francisco Watershed Lands of San Mateo County, Prepared for San Francisco Water Department, June 1990.
/f/ Environmental Science Associates, Field reconnaissance, April 1993.

Source: Peninsula Watershed Natural and Cultural Resources, 1994.

Table 2-1 Special Status Plant Species Reported from the Peninsula Watershed



Biological data compiled by ESA, Inc. and Diane Renshaw (1993-94)

GIS Mapping by EDAW, Inc. - San Francisco

Feet 1000 0 2000 4000 6000

Meters 500 0 1000 2000

N

Original Scale 1 : 24,000

Figure 2-6 Sensitive Wildlife Habitats and Species

these special status species, as well as habitat areas for the San Francisco garter snake/red-legged frog, San Bruno elfin butterfly, and Mission blue butterfly.

The combination of sensitive wildlife communities and special status species, along with sensitive vegetation communities and special status plant species, forms the Composite Ecological Sensitivity Zones. Shown in Figure 2-7, this map illustrates those ecological resource areas of the watershed with high, moderate, and low sensitivity.

2.7 Fisheries

The three reservoirs of the watershed and their tributary streams primarily contain coldwater fishery resources. The reservoirs and most streams also contain exotic species (e.g. ,mosquitofish, largemouth bass, etc.). The impact of the exotic species is unknown. In other areas of California, exotic species such as largemouth bass and green sunfish prey upon the native species, resulting in reduced and, in some cases, extinct native fish populations.

The important and sensitive species fishery resources within the watershed include native fishes such as the rainbow trout. Although numbers of rainbow trout have been collected throughout the watershed, native fish species such as the Sacramento sucker, tule perch, and various sculpin species appear to be either absent or few in number. The Sacramento sucker and tule perch are not distinguished as threatened or endangered species; however, their decline as a result of the presence and operation of the reservoirs indicates their sensitivity to environmental disturbances.

For further information on fisheries, refer to the Natural and Cultural Resources study in Appendix A-4.

2.8 Cultural Resources

Archaeological records indicate that the San Francisco Peninsula was intensively occupied during prehistoric times, as it was an environmentally favorable locale with a variety of exploitable resources from the San Francisco Bay, the interior foothills and valleys, and the Pacific Ocean. The influx of European and American populations into the Bay region, beginning with the Spanish exploration in 1769, resulted in a long and diverse history for the watershed. A comprehensive historical overview for the watershed suggests that the major historical periods include the Spanish Exploration, Mission, Mexican Rancho, American, and Spring Valley/San Francisco Water Department eras.

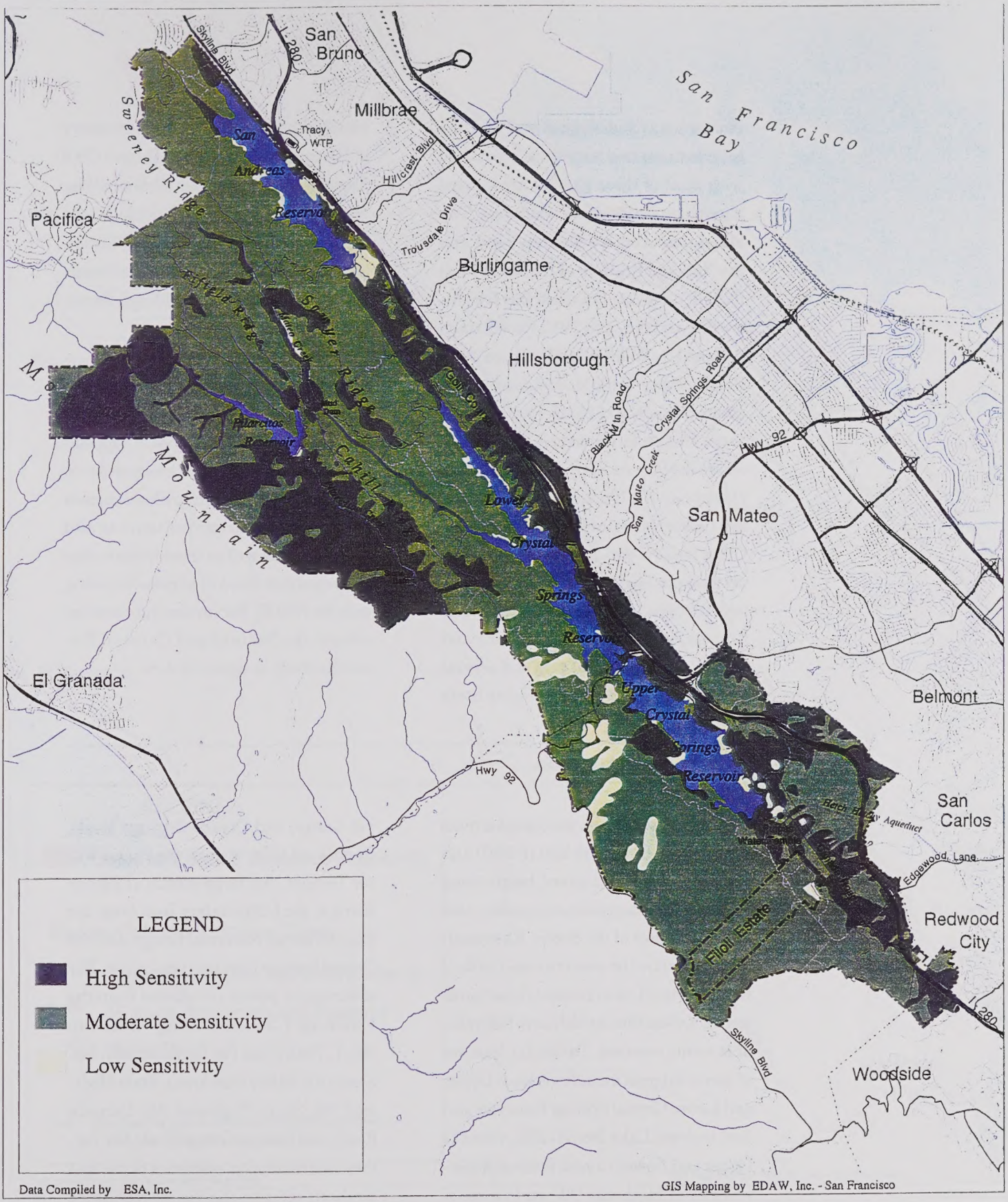


Figure 2-7 Composite Ecological Sensitivity Zones

Original Scale 1 : 24,000

Numerous archaeological sites and historic features and structures associated with most of these periods are located throughout the Peninsula Watershed. Two historic resources are currently listed with the National Register of Historic Places (NRHP): the San Francisco Bay Discovery Site and the circa 1915 Filoli Estate, designed by Willis Polk. The circa 1938 Pulgas Water Temple, designed to celebrate the arrival of Hetch Hetchy water to the Peninsula Watershed, and the site where the Portola Expedition camped in November of 1796 are both designated as a California State Historic Landmarks. Other historic and prehistoric resources may also be eligible for listing, particularly the circa 1893 South Crystal Springs Cottage, as well as other prehistoric and historic archaeological sites and several historic structures listed as either State Historic Landmarks, California Inventory of Historic Resources, or Historic Civil Engineering Landmarks. Additional historic structures and features include pre-1948 water department dams, flumes, tunnels, pump stations, watershed keepers' cottages, facilities buildings, barns, and fountains.

The Known Cultural Resources and Potential Sensitivity Zones map, illustrated in Figure 2-8, indicates zones of high and moderate cultural resource sensitivity on the watershed. The map also indicates the location of historic structures and stage roads, as well as those historic sites that are either listed or eligible for listing with the NRHP. For further information, refer to the Natural and Cultural Resources study in Appendix A-4.

2.9 Aesthetics

The eastern side of the watershed is quite visible from Interstate 280 (I-280) and several population centers, heightening concerns regarding aesthetic quality. One of the purposes of the Scenic Easement, which overlays the western two-thirds of the watershed, is to protect those lands from activities that would harm this valuable scenic resource. Particular features of scenic interest include views of Upper and Lower Crystal Springs Reservoir and San Andreas Lake from I-280, views of Upper and Lower Crystal Springs Reservoirs from Highway 92; and views of Lower Crystal Springs Reservoir and San Andreas Lake from the San Andreas, Sawyer Camp, and Crystal Springs Trails. Special use areas include the Pulgas Water Temple, the large statue of Father Serra at the I-280 Safety Rest Area, the Eugene Doran Memorial Bridge, and the Crystal Springs dam and vista point. Key observation points are offered from the following: I-280 (including Vista Point No. 1, Vista Point No. 2, Vista Point No. 3, and the Safety Rest Area), State Highway 92, State Highway 35, Canada Road, and Sawyer Camp Trail. For further information on aesthetics of the watershed, refer to the visual resources technical memorandum in Appendix C-5.

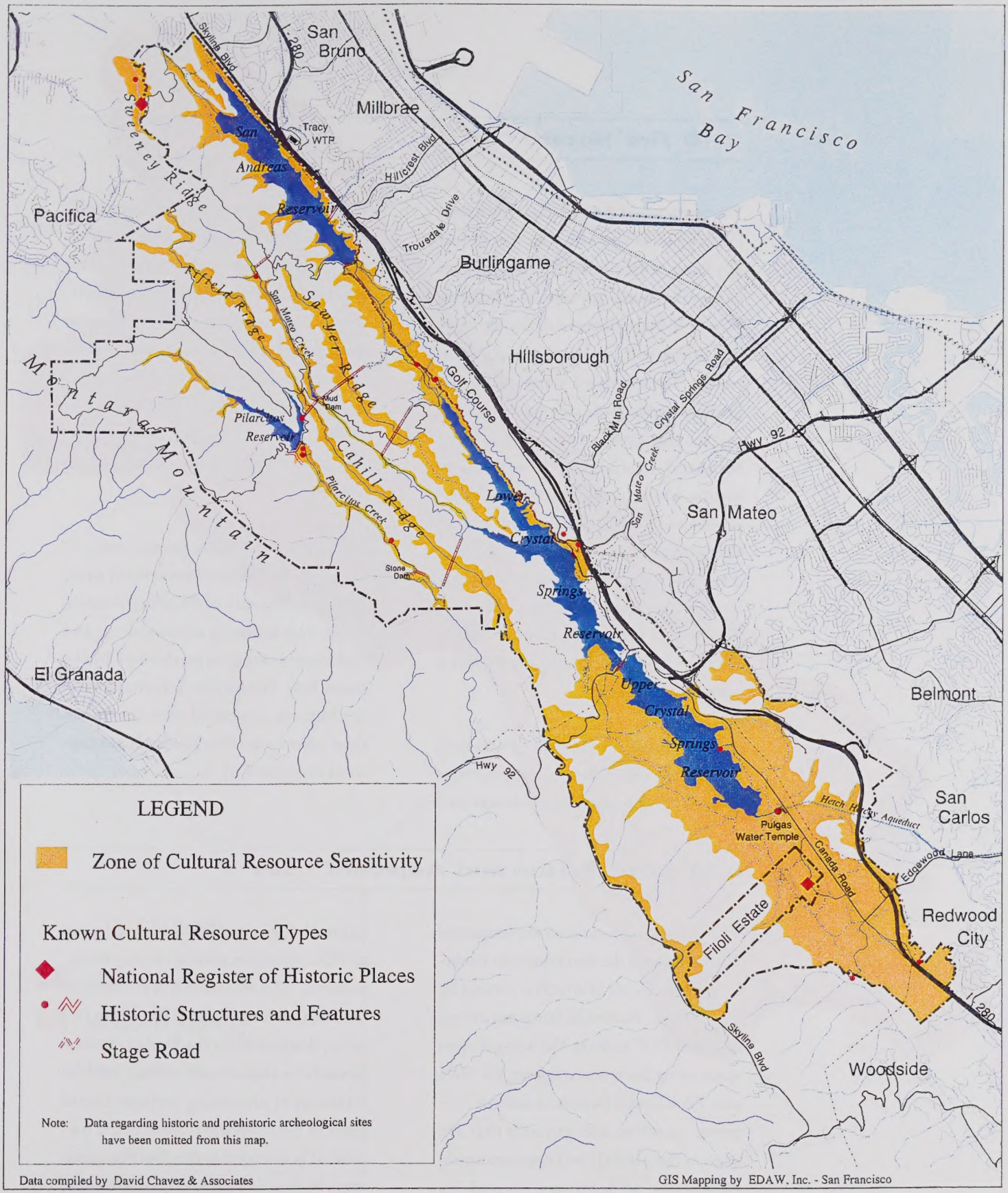


Figure 2-8 Known Cultural Resources and Potential Sensitivity Zones

2.10 Fire Hazard

The proximity of the Peninsula Watershed to the ocean brings with it air that is usually laden with moisture. This moisture generally limits ignition of wildfires. However, the movement of the fog bank also brings with it periods of high speed winds. The increased moisture, lack of grazing, and lack of extensive vegetation and fire management activities have encouraged a conversion from grass to shrubs, which have greater biomass but lower ignitability. Because the watershed has not experienced a fire of any magnitude in over 100 years, the accumulation of fuels is of concern. In 1977, the State of California Department of Forestry designated the watershed as a hazardous fire area.

Limited public access to the watershed reduces the risk of fire. However, proximity of the watershed to population centers poses some concern. The eastern side of the watershed is quite visible to several population centers and thus concerns regarding aesthetic quality are heightened. The proximity to the public also results in a high level of concern regarding structural damage from a fire spreading from SFPUC lands. As true of all SFPUC lands, the impacts of fire on water quality and quantity are of greatest concern.

Figure 2-9, the Wildfire Severity map, illustrates the potential severity of wildfires as a measure of dwelling density, slope, vegetation as a fuel source, and fuel hazard rating as established by the Bates Bill. For further information on fire hazards associated with the watershed, refer to the Fire Management Element in Appendix A-1.

2.11 Land Status and Adjacent Uses

The Peninsula Watershed encompasses 23,000 acres of the San Francisco Peninsula, virtually all of which is owned by the SFPUC. Watershed lands not owned by the SFPUC include 355 acres of open space along the western border, the 650-acre Filoli Estate (which includes a residence, gardens, and grounds that are open to the public), and approximately 200 acres of highway owned by CalTrans.

Although the watershed is owned by the SFPUC, there are several overlay designations. The watershed is part of the Central California Coastal Biosphere Reserve, designated by the United Nations through the Department of State with the intention of protecting certain coastal lands of the watershed. Most of the watershed is included in the San Francisco State Peninsula Fish and Game Refuge, which has existed since 1933 and was in-

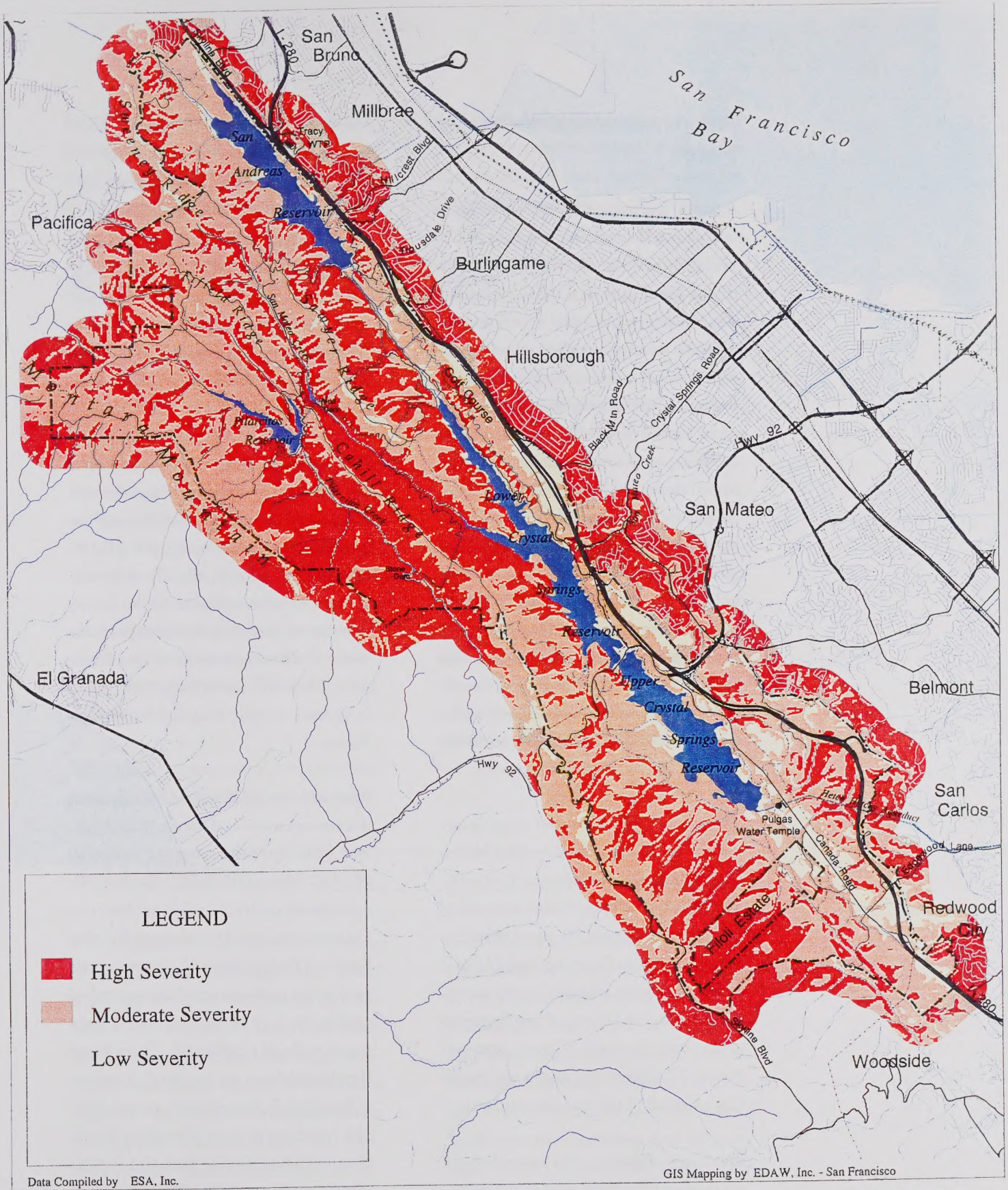


Figure 2-9 Wildfire Severity

tended to preserve the land for ecological purposes.

A Scenic Easement (19,000 acres) and a Scenic and Recreation Easement (4,000 acres) also overlay the watershed, as indicated in Figure 1-6. The easements were developed in 1969 in conjunction with the development of Interstate 280 and serve as four-party agreement between the SFPUC, the U.S. Department of the Interior, the California Department of Transportation (CalTrans), and San Mateo County to preserve the Watershed as open space lands to protect water quality, subject to the construction and ongoing maintenance of water utility-related infrastructure. The Scenic Easement does not allow public access, whereas limited recreation activities are permitted in the Scenic and Recreation Easement. The watershed is also designated by the California Department of Forestry as a hazardous fire area.

The watershed is located completely within San Mateo County. San Mateo County has a total population of 696,000, with an expected population increase of 8 percent in the next 20 years (Association of Bay Area Governments [ABAG] 1994). Counties adjacent to the watershed include the County of San Francisco to the north, Santa Cruz County approximately 17 miles to the south, and Santa Clara County 6 miles to the southeast.

Land uses adjacent to the watershed are predominantly residential to the north, south, and east. The watershed is bordered on the north by San Bruno (population 40,900); on the east by Millbrae (population 21,000), Burlingame (population 29,000), Hillsborough (population 11,000), San Mateo (population 94,000), Belmont (population 25,800), San Carlos (population 29,300), and Redwood City (population 94,300); and on the south by Woodside (population 6,100). (Population figures are for 1995 and were provided by ABAG.)

The San Francisco jail lies directly north of the watershed in San Bruno. Edgewood County Park (300 acres) borders the southeastern edge along I-280. The Phleger Estate, a 1,200-acre residential site, lies adjacent to the southwest border and is under the supervision of the Golden Gate National Recreation Area. Huddart County Park (1,000 acres) is located directly south of the Phleger Estate.

Approximately 355 acres of lands along the western watershed border (from Highway 92 to San Bruno) are not owned by SFPUC. Most of this land is undeveloped open space and is classified as Resource Conservation Area Hillsides and Existing Regional Parks. About 10 percent of this land at the northern tip of the watershed within the City of San Bruno has been zoned as Rural Residential. These Rural Residential Areas are the result of a series of Site Specific Amendments passed since 1981 and are outside of the San Mateo County Urban Service Area and outside of any incorporated city. These sites contain a number of septic sewerage systems.

Privately owned developments west of the watershed include Skylawn Cemetery close to Highway 92 and the Browning Ferris Landfill. Both of these sites are being considered for expansion, which may impact the watershed. Refer to the General Plans Review, Appendix C-9, for further information.

2.12 Transportation and Access

A total of 100 miles (371 acres) of paved roads and 60 miles (54 acres) of unpaved roads and trails have been identified on the Peninsula Watershed through GIS analysis. The road system consists of approximately 52 miles of highways and ramps, 48 miles of paved roads and streets, 35 miles of unpaved roads, and 25 miles of trails. The paved and unpaved access roads are used by the watershed keepers to patrol the watershed and by operations personnel who maintain the water system. They also serve as fire trails.

The major transportation corridor through the Peninsula Watershed is I-280 or the Junipero Serra Freeway. About 14 miles of I-280 traverse the Peninsula Watershed. Six interchanges provide local access to adjacent urban areas. These interchanges are: the Larkspur-Hillcrest interchange, Black Mountain interchange, Bunker Hill interchange, the Route 92 interchange, Edgewood Road interchange, and the South Canada Road interchange. Highway 92 connects San Mateo and Half Moon Bay and bisects the watershed between Upper and Lower Crystal Springs Reservoirs. Skyline Boulevard (Highway 35) extends south from Highway 92 along the western boundary of the watershed.

2.13 Utilities

The regional Pacific Gas and Electric (PG&E) natural gas and electrical transmission lines for the San Francisco Peninsula are located on the watershed along the I-280 corridor. Four overhead electrical transmission and distribution lines together with a series of transformers run through the watershed west of I-280; they provide electrical service to the urbanized areas east of I-280 and to SFPUC facilities on the watershed. One overhead electrical transmission line runs through the watershed along Highway 92 to Half Moon Bay. An electrical transmission line that runs from Pacifica to Half Moon Bay intermittently crosses the Peninsula Watershed. A number of cellular telephone antennas and equipment facilities are located along the I-280 corridor within the watershed. Refer to the Utilities and Infrastructure Review, Appendix C-10, for further information.

2.14 Operations and Maintenance

SFPUC operations on watershed lands include land maintenance and/or construction that must occasionally be performed. Watershed lands are patrolled by watershed keepers. SFPUC operates boats on the watershed reservoirs for use by the watershed keepers in patrolling and maintaining the reservoirs. SFPUC also operates a water treatment plant adjacent to the watershed and covered water storage facilities within the watershed. An abandoned quarry within the Watershed is currently used as a storage facility by SFPUC and has authorized uses by others. In addition, resource management activities performed by SFPUC include fire management and erosion control.

2.15 Recreation

Public recreational opportunities are available within the Scenic and Recreation Easement, located adjacent to I-280. San Mateo County Parks and Recreation Department manages and maintains 25 miles of public trails within the easement. The most popular of these trails is the 6-mile Sawyer Camp Trail. The paved trail provides recreation opportunities for hiking, biking, equestrian use, and birdwatching. Additional public trails that border the watershed include Sheep Camp Trail, Sweeney Ridge Trail, San Andreas Trail, Crystal Springs Trail, Ralston Trail, and Edgewood Trail. A trail map is available to visitors and limited trail signage is provided by San Mateo County. Access to watershed lands outside of the Scenic and Recreation Easement is limited to organized groups with a permit from the SFPUC.

Other popular activities available within the watershed include golfing at the Crystal Springs Golf Course, Bicycle Sundays sponsored by the San Mateo County Parks and Recreation Department, running at the Hallmark Running Course, and activities allowed by permit such as weddings and special events at the Pulgas Water Temple. The watershed is closed to the public during times of high fire risk.

Recreational facilities adjacent to the Peninsula Watershed include community parks, public and private golf courses, regional parks, preserves, and refuges. For further information on recreation, refer to the technical memorandum in Appendix C-11.

2.16 Other Watershed Activities

Principal watershed activities on SFPUC-owned lands consist of: SFPUC operations and resource management activities, trail and golf course use, use of utility and automobile corridors, revenue-generating activities allowed by permits and leases, use of sanitary facilities, and wildlife activities. Public boating and swimming are prohibited for health and safety reasons by the Department of Health Services.

Activities on watershed lands not owned by the SFPUC include operation of the Filoli Estate. Planned changes to the watershed include the widening of Highway 92 from Crystal Springs Reservoir to the west.

2.17 Revenue Generation

In addition to earning revenue from water sales to the City of San Francisco and local suburbs, SFPUC earns revenue on a number of permits and leases for activities on SFPUC-owned watershed lands. In fiscal year (FY) 1993-1994, SFPUC leased 206 acres of land on the Peninsula Watershed for a variety of activities which generated approximately $330,000 in revenue. The majority of this revenue was generated by the Crystal Springs Golf Course. Refer to the Economic Profile of Watershed Land Management by the SFPUC, Appendix C-7, further information on this topic.

2.18 Existing Codes and Regulations

Certain Federal and State codes and regulations apply to the management of the watershed. The following is a summary of applicable regulations.

2.18.1 Environmental Review

Three levels of environmental review are possible for actions on the Peninsula Watershed and are based on CEQA and the National Environmental Policy Act (NEPA). CEQA review is generally sufficient for all programs/projects unless there is a proposed Federal action in which case NEPA analysis is required.

Under CEQA, both programmatic and project-level reviews are possible. Programmatic review generally applies in cases such as the Peninsula Watershed Management Plan where a broad set of actions and policies that are related geo-

graphically are being proposed. Project-level analysis is generally conducted on a site-specific action such as the construction of a new building or golf course. NEPA review occurs when there is a proposed Federal action. The following sections describe the CEQA program-level and project-level review processes as well as the NEPA review processes in greater detail.

CEQA Program-Level Review

The Peninsula Watershed Management Plan is subject to environmental review under CEQA (Section 15378 of the CEQA Guidelines). The City and County of San Francisco is the "Lead Agency" (i.e., the government agency which has the principal responsibility for approving the Plan). As Lead Agency, the Office of Environmental Review (OER) will oversee the preparation of the required CEQA environmental review, including determination of what level of environmental review is required. In its administration of CEQA, OER has determined that the Plan requires the preparation of a Program-level EIR to be prepared in accordance with State CEQA Guidelines Section 15168 and 15120 et seq.

A program EIR is appropriate for this project because the Peninsula Watershed Management Plan constitutes a series of actions which can be characterized as one large project which is related: "..a) geographically; b) as logical parts in a chain of contemplated actions; and c) in connection with the issuance of...plans...to govern the conduct of a continuing program.." [Section 15168(a), State CEQA Guidelines].

Program-level EIRs are commonly used by government agencies for projects similar to the adoption of this Plan. Advantages associated with preparing a program-level EIR include: it offers the Lead Agency and the public an opportunity to see the overall impacts of the program; ensures consideration of cumulative impacts that might be slighted if considered on a case-by-case basis; avoids duplicative reconsideration of basic policy considerations; allows the City/County to consider broad policy alternatives and program-wide mitigation measures at an early time when the agency has greater flexibility to deal with basic problems or cumulative impacts; and allows reduction in paperwork.

As a program EIR, the document will identify the anticipated program-wide environmental impacts and mitigation measures, including a description of the current environmental conditions within the study area and identification of the potential environmental impacts that could result from implementation of the Plan. Impacts deemed significant will be reduced to an insignificant level by modifying the Plan to reduce or avoid impacts, and by implementing measures to mitigate impacts. This process allows the decision-makers the flexibility to refine the Plan (and/or develop mitigation measures) as the environmental analysis occurs, thereby enhancing their ability to

put forth an environmentally sustainable Plan.

CEQA Project-Level Review

Following certification of the program-level EIR and adoption of the Plan, additional environmental analysis may be required prior to implementation of individual projects. Such projects include those that would have effects not specifically or comprehensively examined within the scope of this program-level EIR, including construction and operation of projects proposed by private entities (e.g., a golf course) which would require approval/discretionary action by the City/County. In addition, some SFPUC activities which require approval from another agency, such as dredging or controlled burn operations, may be subject to subsequent CEQA review.

The level of subsequent environmental review needed would be determined by the City/County (or other government agency charged with approval authority - i.e., issuance of a permit) on a case-by-case basis. Such review may include the preparation of a Subsequent EIR or simply an Initial Study/Negative Declaration. All subsequent analysis would tier off of the program-level EIR wherever feasible. To "tier off" means that the subsequent analysis would rely on information and/or incorporate by reference the analysis provided in the program-level EIR, including use of existing conditions, cumulative impacts, growth inducement, and other sections as appropriate. In so doing, the City/County can effectively streamline and reduce the amount of paperwork needed for the required environmental review process.

NEPA Review

The National Environmental Policy Act of 1969 is the Federal equivalent of CEQA. As such it is administered by Federal agencies and would be applicable to the watershed if activities were proposed which were either financed, assisted, conducted, or approved by a Federal agency. For example, issuance of a discretionary permit from a Federal agency, such as the U.S. Army Corps of Engineers (COE), National Park Service (NPS), or the U.S. Fish and Wildlife Service (USFWS), may trigger the need for environmental review under NEPA.

In general, the requirements of NEPA and CEQA are very similar, although NEPA places greater emphasis on alternatives' development and analysis, and socioeconomic/environmental justice effects (the latter of which are not required by CEQA). In the event that NEPA documentation was required for a specific watershed activity, the information and environmental analysis provided in the program-level EIR prepared for the Peninsula Watershed Management Plan may be used where feasible. It should be noted, however, that the responsibility and oversight of NEPA compliance would be that of the Federal "Lead Agency" and not the City/County, unless the City reached

agreement regarding joint lead agency status with the Federal agency.

2.18.2 Other Relevant Codes & Regulations

In addition to the environmental review requirements described above, implementation of individual programs or activities may be subject to the review and approval (i.e., issuance of a permit) of a government agency other than the City and County of San Francisco.

Many of SFPUC's standard operation and maintenance practices, as well as new activities or periodic uses, may be regulated by agencies other than the SFPUC. This "regulation" ranges from review authority to formal consultation to permit approval. A list of the primary agencies which may have this purview over watershed activities is provided below, followed by a summary of the activities that would trigger the need for their review/permit approval.

Federal

U.S. Fish and Wildlife Service
U.S. Army Corps of Engineers
U.S. Department of the Interior

State

California Department of Fish and Game
California Department of Forestry and Fire Protection
California Department of Health Services
California Department of Pesticide Regulation
California Department of Transportation
California Department of Water Resources
California Division of Safety of Dams
State Office of Historic Preservation
State Water Resources Control Board

Regional

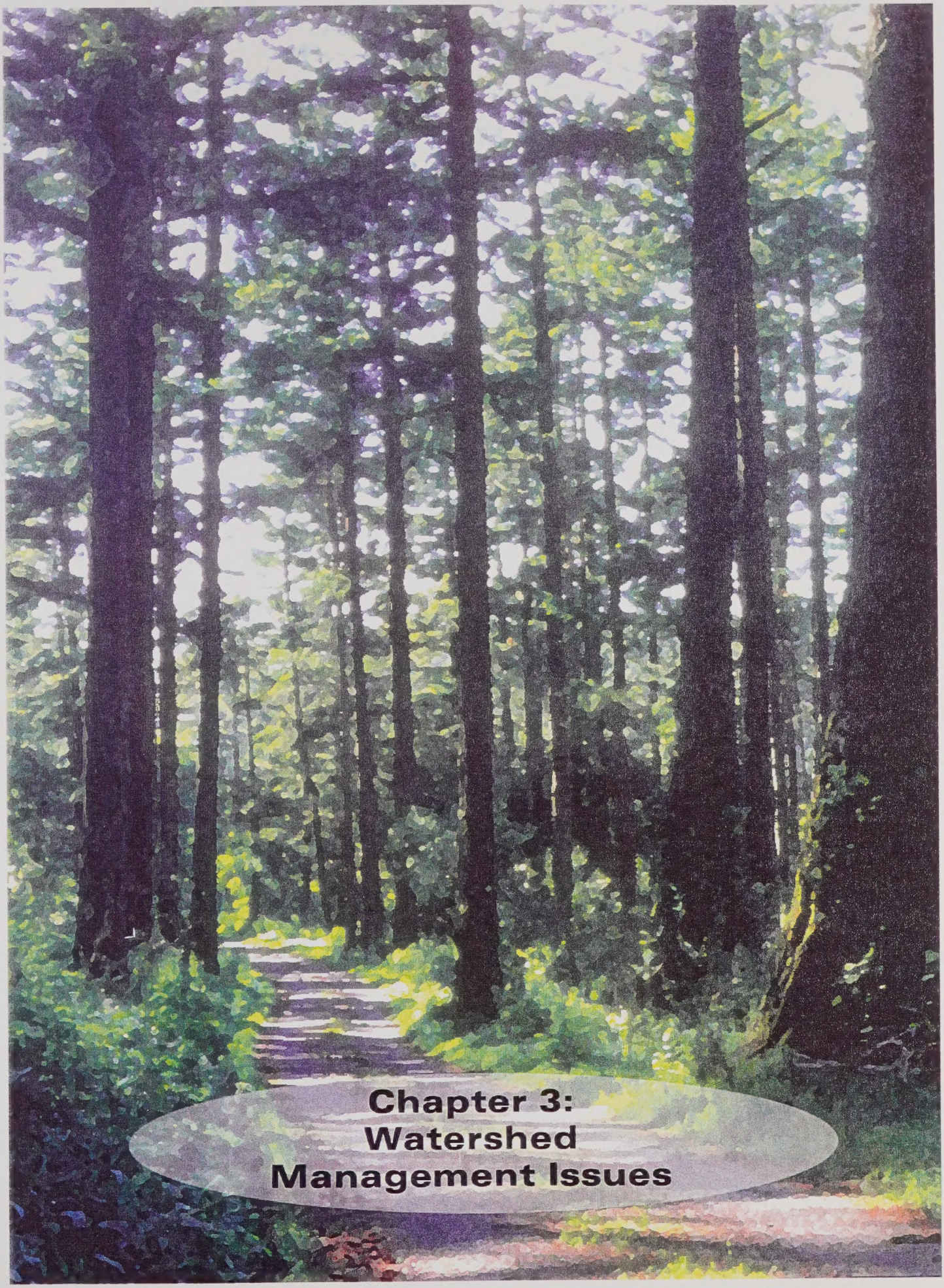
Bay Area Air Quality Management District
Regional Water Quality Control Board

Activities which may trigger the need for a permit or other review by the agencies listed above include: activities which may affect a Federal or State-listed species; application of pesticides; dredging; dam maintenance; construction activities which would emit pollutants into the atmosphere or disturb more than five acres; controlled burns; activities conducted within a state highway right-of-way; and/or alteration of jurisdictional wetland (Federal) or streambed (State).

2.19 Related Projects and Studies

Other projects in which the SFPUC is involved include the preparation of an overall Water Supply Master Plan for the entire water system which will address water supply and storage for the entire system. In addition, the SFPUC is also undertaking the following projects on the Peninsula Watershed:

- Watershed Facilities Demolition
- Adit Structures
- Watershed Keepers Cottage Upgrade
- Watershed Cottage Maintenance and Renovation
- Structural Evaluation of SFWD Adits, Study
- Crystal Springs Pump Station and Pipeline
- Lower Crystal Springs Dam Abutment Project
- Pulgas Valve Lot Upgrade Phases I and II
- Crystal Springs Balancing Reservoir
- Stone Dam Rehabilitation
- Boat ramp improvements
- Automation of operations
- Additional pipeline improvements/ upgrades
- Seismic studies on dams



Chapter 3: Watershed Management Issues

Chapter 3. Watershed Management Issues

3.1 Introduction

The watershed management issues discussed in this chapter were identified during the planning process and collected from a number of sources, including: site surveys and analysis by the watershed planning team, interviews with SFPUC staff, three rounds of agency and public workshops, and a statistically valid consumer survey of randomly selected households in the SFPUCs service area. The identification and clarification of all pertinent issues are an integral part of the planning process and set the stage for the development of goals, policies, and actions required for successful management of watershed resources.

"Watershed issues are complex and interrelated."

Watershed issues are complex and interrelated. For example, there is a potential for fertilizer-laden runoff to increase reservoir nitrogen and phosphorus levels. This in turn can increase algae growth. Large algae populations can lead to reduced oxygen concentrations as they decompose. Treatment difficulties often result from anoxic water. The SFPUC occasionally applies copper sulfate to the reservoirs to kill the algae blooms; however, copper sulfate can affect aquatic species. This issue, once solely an issue of water quality, now overlaps a number of issue areas.

Another example of how watershed issues overlap relates to water quality, water supply, ecological resources, fire and safety, and fiscal impacts. The absence of fire from the watershed affects ecological resources by causing a modification of natural fire cycles and a build-up of fuels. This affects human safety by increasing the risk of fire within the watershed and on neighboring lands. Following a catastrophic fire, water runs off the burned slopes at an increased rate causing erosion, turbidity, and sedimentation in the reservoirs, affecting both water quality and water supply. Related fiscal impacts include liability and increased water treatment costs as well as the costs of natural resource restoration measures required to mitigate impacts.

This chapter is organized into the following sections: water quality, water supply, natural and cultural resources, fire and safety, watershed activities, public awareness, and fiscal concerns. Within each of these sections, watershed management issues are identified and generally organized in order of highest to lowest priority. The goals, policies, management actions, and guidelines identified in Chapters 4 and 5 are based upon the issues identified in this chapter. Chapter 6 outlines the phasing required for implementing the management actions.

3.2 Water Quality

This symbol refers to Water Quality throughout the Plan

Protection of water quality is the primary mission and responsibility of the SFPUC. The primary concern of the public is also protection of the quality of their drinking water as indicated by comments received during the public workshops and reinforced by the results of the public survey. The following section identifies the management issues related to water quality including: roads and vehicle usage; risks associated with microorganisms; erosion control; vegetation and pest management; risks associated with hazardous materials; water quality monitoring; risks associated with metals; earthquakes and other geological hazards; and interjurisdictional coordination and regulatory responsibilities.

3.2.1 Roads and Vehicle Usage

- Amount and intensity of runoff from paved roads, dirt roads, road cuts, road construction, and maintenance;
- The existing road system needs to be evaluated to determine if there are more roads than necessary to meet SFPUC maintenance and operation needs;
- Runoff of vehicle-related contaminants from roads, parking areas, and SFPUC facilities; and
- Construction and maintenance-related activities, fire management activities, and vehicular use/maintenance.

3.2.2 Risks Associated with Microorganisms

- Human and animal waste (e.g., deer, seagulls, horses, pets, and other wildlife) increases the risk of microorganisms entering the reservoirs;
- Certain microorganisms such as *Cryptosporidium*, which are a major public health concern, are extremely difficult to remove from the water supply;
- Public access and trespassing can lead to body contact with reservoirs;
- Potential lack of use by the public of sanitation facilities;
- Potential spills/leakage from SFPUC facilities and chemical toilets used during construction and temporary field operations; and
- Potential leakage from residential sewage collection systems, septic systems, and sanitation facilities associated with upstream uses.

3.2.3 Erosion Control

- Increased turbidity and sedimentation in the reservoirs, resulting from erosion, degrades water quality and increases the risk of trihalomethane (THM) precursors;
- Lack of explicit guidelines for construction, maintenance, and operational activities;
- Vegetation removal through construction and maintenance activities and by wildlife;

- Rate and volume of runoff to reservoirs from compacted soils;
- Increased sediment loading due to deferred maintenance on sedimentation basins;
- Amount and intensity of recreational uses;
- Maintenance and irrigation activities at SFPUC facilities;
- SFPUC operational activities related to construction and maintenance, parking and vehicle usage, reservoir water level fluctuation, and Harry Tracy WTP activities;
- Amount and intensity of runoff from impervious surfaces, dirt roads, road cuts, storm drainages, road construction and maintenance activities, and fire management activities; and
- Risk of fire caused by vehicular use, recreational use, commercial uses (e.g., gas pipelines, Filoli Estate), and nearby residences.

3.2.4 Vegetation and Pest Management

- Runoff of pesticides and fertilizers from maintenance activities;
- Fertilizer-laden runoff increases the nitrogen and phosphorus content of the reservoirs and increases algae growth;
- Vegetation management along roadways, water pipeline corridors, and from fire management activities; and
- Rodent population control activities.

3.2.5 Risks Associated with Hazardous Materials

- Hazardous materials spills from vehicles, boats, and chemical toilets;
- Runoff from household use of hazardous materials;
- Spills related to chemical and fuel delivery and site runoff;
- Runoff of fire suppression chemicals used by SFPUC staff and other fire management groups;
- Runoff of asbestos fibers, found in serpentine formation throughout the watershed, in the case of disturbance;
- Failure, explosion, or damage of natural gas pipelines during an earthquake or excavation activities;
- Potential release of jet fuel due to the watershed's location within the San Francisco International Airport flight path;
- Lead shot and explosives from shooting range;
- Lack of complete information on pipe materials, alarm systems, and secondary containment for natural gas pipelines;
- Improper disposal of household chemicals. The U.S. Environmental Protection Agency (EPA) has identified 23 priority pollutants that are likely to be disposed of down household drains. Disposal of these chemicals may impair septic system function and may contaminate ground or surface water;
- Public access to reservoir edges increases potential for dumping of haz-

"Protection of water quality is the primary mission and responsibility of the SFPUC"

ardous materials into water supply; and
- Potential use of hazardous materials as part of PG&E maintenance activities.

3.2.6 Water Quality Monitoring

- Need for additional monitoring of existing activities to determine their impact on water quality; and
- Need for additional monitoring downstream of known contaminant sources.

3.2.7 Risks Associated with Metals

- Runoff of metals from abandoned junk, munitions, and debris;
- Lead shot; and
- Runoff of lead and other metals associated with vehicle use.

3.2.8 Earthquakes and Other Geological Hazards

- Failure of facilities, infrastructure, and utilities;
- Slope failure and landslides; and
- Control runoff of asbestos fibers, found in serpentine formation throughout the watershed, in the case of disturbance.

3.2.9 Interjurisdictional Coordination and Regulatory Responsibilities

- Need for coordinated actions between the SFPUC and other upstream, downstream, and adjacent agencies, jurisdictions, and private parties to address water quality issues;
- Increasingly strict water quality regulations to protect drinking water quality; and
- Reduced flexibility and available alternatives to meet newer and stricter regulatory standards; alternatives are limited to more capital and operation costs and stricter control of the watershed.

3.3 Water Supply

Closely related to protection of water quality is ensuring a reliable water supply. The SFPUC constantly strives to find new ways to increase the water supply and to make the present supply more reliable. Management issues related to water supply are erosion control and storage capacity, and water reclamation.

This symbol refers to Water Supply throughout the Plan

3.3.1 Erosion Control and Storage Capacity

- Erosion causes sedimentation, which decreases the storage capacity of reservoirs and tributaries and increases the potential for flooding;
- Reservoir storage capacity has been reduced substantially since reservoir creation due to sedimentation;
- Need for additional water storage;
- Need for additional potable water supply to provide emergency storage;
- Increasing demand for water;
- Increasingly longer periods of drought; and
- See concerns listed under Section 3.2 Water Quality: Erosion Control.

3.3.2 Water Reclamation

- Use of potable water where non-potable, reclaimed water could be substituted; and
- Increased use of raw water by watershed users (e.g., golf course, agricultural activities, irrigation of residential areas), and SFPUC facilities reduces available water for system wide use.

3.4 Natural and Cultural Resources

The plants, wildlife, and fishery resources on the watershed are all part of a healthy and balanced ecosystem. Protection of the watershed resources and maintaining a balanced ecosystem helps the SFPUC meet its primary goal of providing high quality water to its customers. Management issues related to natural and cultural resources on the watershed include: impact of watershed activities; operations/maintenance and regulatory compliance; training; protection of habitat integrity; emergency planning; and data research and monitoring.

This symbol refers to Natural and Cultural Resources throughout the Plan

3.4.1 Impact of Watershed Activities

- Existing fuel, pest, and vegetation management activities are not coordinated;

"The public is concerned with protecting the ecological and cultural resources of the watershed"

- Impacts of golf course on habitats;
- Impacts of trail use and maintenance on wildlife and special status species;
- Existing fuelbreak and firebreak construction and maintenance do not adequately address wildlife habitat and use;
- Vegetation management (e.g., roadside clearing, noxious weeds) activities do not address special status species habitat;
- Pest eradication programs do not address impacts on other species;
- Hydrological functions need to be balanced with habitat needs;
- Disruption of natural drainage systems and degradation of aquatic habitat;
- Altered stream channel morphology;
- Altered aquatic and floodplain habitats;
- Impacts of reservoir fluctuation on shoreline habitat;
- Operations and maintenance impacts on aquatic species;
- Treated and chlorinated water is discharged into Crystal Springs Reservoir and may have harmful impacts on aquatic organisms;
- Improved management of sedimentation basin and pond management is required to adequately address aquatic resources and wetlands/riparian habitat;
- Impact of downstream releases on fisheries, riparian habitat, and streambank erosion; and
- Build-up of copper used during some SFPUC activities may affect aquatic species.

3.4.2 Operations/ Maintenance and Regulatory Compliance

- Actions to satisfy operational and long-term infrastructure maintenance needs may cause inadvertent damage to ecological and cultural resources, and may conflict with environmental regulatory compliance requirements.

3.4.3 Training

- SFPUC operations work forces are not all trained in watershed resources (e.g., resource identification, regulatory compliance), which has resulted in inadvertent damage to natural and cultural resources;
- Need for training related to operational guidelines that can be readily applied by contractors and field staff; and
- Need for additional funding for training related to permitting management, personnel training, and continuing education.

3.4.4 Protection of Habitat Integrity

- Fragmentation and disruption of terrestrial habitat;
- Lack of adequate protection of sensitive habitat areas;
- Introduction of aggressive, exotic species that displace native species and decrease biodiversity;
- Disturbance to and loss of habitat from new development and land uses;

- The watershed habitat that exists today developed with the exclusion of fire. This habitat is considerably different than the habitat would be under a naturally occurring fire regime;
- Potential impacts from feral hogs as their range expands;
- Impact on wildlife movement from roads, trails, fences, and additional watershed activities; and
- Disruption of native wildlife by domesticated wildlife, as areas adjacent to the watershed become urbanized.

3.4.5 Emergency Planning

- Need for additional emergency planning and pre-incident preparation for the protection of natural resources during emergency response can result in short and long-term impacts on ecological and cultural resources; and
- Need for guidelines for response to fires and spills in areas with sensitive resources.

3.4.6 Data Research and Monitoring

- Need for additional baseline resource data and ongoing program monitoring hampers effective resource decision-making; and
- Effectiveness of various resource management actions on affected resources need to be monitored to determine their successes and failures.

3.5 Fire and Safety

This symbol refers to Fire and Safety throughout the Plan

A catastrophic fire can have a tremendous impact on natural resources, the visual environment, and potentially on adjacent urban areas and can also have a significant deleterious effect on water quality and the water supply system. The SFPUC strives to protect the watershed from fire and manage the watershed fuels to prevent a catastrophic fire and avoid these far-reaching impacts. Management issues relate to fire management, emergency response, and liability.

3.5.1 Fire Management

- Need for a comprehensive fire management plan;
- Build-up of hazardous fuels;
- Fire suppression activities that result in alteration of natural fire cycles;
- Increased risk and potential magnitude of fire hazard due to excessive fuel load (i.e., vegetation overgrowth);
- Lack of sufficient fire hazard reduction activities;
- Need for additional fire response staff and equipment;
- Shortage of fire response staff during the fire season;
- Limited ability to respond to a major fire due to inadequate infrastructure (e.g., heliports) and incomplete system of water collection and storage facilities throughout the watershed;
- Public access to high fuel areas and during high fire season increases the risk of fire;
- Inadequate vehicle maintenance increases risk of fire;
- Urban encroachment adjacent to and upstream of the watershed increases the risk of fire damage to adjacent properties;
- Incidence of fire starts from adjacent neighboring areas; and
- Incidence of fire from roadways, fuel pipelines, and electric transmission lines that pass through the watershed.

3.5.2 Emergency Response

- An integrated emergency response plan and appropriate training for response to all watershed emergencies is needed;
- Need for improved communications equipment;
- Inadequate coordinated emergency response with other agencies; and
- Inadequate internal coordination between watershed-wide and facility-specific emergency response.

3.5.3 Liability

- New or expanded watershed activities may increase personal-injury risks and thus increase SFPUC's liability;
- Liability associated with public access; and
- Liability associated with fire hazard.

3.6 Watershed Activities

This symbol refers to Watershed Activities throughout the Plan

The SFPUC and the public are generally in agreement on the key issues in the areas of water quality, water supply, natural and cultural resources, fire and safety, public awareness and fiscal concerns. However, in the area of watershed activities which includes watershed maintenance and lease management as well as public access, the SFPUC and the public have differing goals. The SFPUC's major responsibility is to protect water quality and the watershed resources. It manages its own activities and the activities of lessees to meet these responsibilities. However, without some control over public access and activities, it is difficult to ensure high water quality and protection of natural resources.

Certain members of the public understand this need for control while others do not. This results in the public being divided on the appropriate level of public access. Various members of the public have supported all of the following levels of access—exclusion of public access, controlled public access, balancing public access, maintaining the current access level, low impact public access, increased public access, and unlimited public access. Specific access issues on which the public is divided include golf courses, hiking, equestrian access, fishing, boating, hunting, shooting ranges, and mountain bikes. The public is also divided on the value of educational and scientific access—some feel it should be increased and others feel it should be limited to avoid damage to the watershed.

The management issues related to watershed activities are: determining activity compatibility and impacts; lease management; public access; SFPUC operations; management and maintenance; visual impacts; interjurisdictional coordination; and public education.

3.6.1 Determining Activity Compatibility and Impacts

- Need for policies and management actions to determine which activities are compatible and incompatible with watershed protection and management;
- Need for a process to assess proposals, projects, and work orders by requiring the completion of an environmental impact checklist to assess the impacts of activities on watershed resources; and
- The impacts of existing recreational activities on the watershed are not monitored to determine whether watershed resources or the recreational experience (e.g., overcrowding) are being adversely affected. A threshold for significant impacts is needed.

"The public is concerned with public access issues and are divided on the appropriate level of public access to the watershed"

3.6.2 Lease Management

- Management of existing leases is not coordinated with protection of watershed resources;
- Impacts of existing lease activities on water quality, water supply, and ecological and cultural resources need further study; and
- Existing lease activities have been in place for many years without evaluation of their appropriateness as watershed activities.

3.6.3 Public Access

- Need for updated and clear public access policies and guidelines;
- Need for a clear and efficient permitting system to cover activities requiring a permit; and
- If the watershed is opened to extensive public access, it will be difficult to close and restore the watershed if the activities are found to be detrimental.

3.6.4 SFPUC Operations, Management, and Maintenance Activities

- Need for ongoing annual maintenance activities to occur on a timely basis.
- Policies and practices are not currently in place for some SFPUC management and maintenance activities, resulting in damage to watershed resources; and
- Some watershed roadways do not meet standards for levels of use.

3.6.5 Visual Impacts

- The visual impacts of existing watershed activities have not been evaluated; and
- Lack of guidelines to determine the visual impacts of existing and proposed watershed activities.

3.6.6 Interjurisdictional Coordination

- Urban encroachment; and
- Compatibility of existing and proposed watershed activities with jurisdictional overlays — Scenic and Recreation Easements and San Francisco Fish and Game Refuge.

3.6.7 Public Education

- Lack of facilities, resources, and methods to educate and interpret watershed values.

3.7 Fiscal

The cost of providing high quality water to SFPUC customers is borne primarily by the rate payer, with additional sources of funds from leases or permits. These rates cover the costs of maintaining a high quality delivery and treatment system. It is appropriate for the SFPUC to pay for watershed activities that protect the quality and quantity of water and the natural resources. Fiscal management issues include: costs and benefits of lease and permit activities, SFPUC coordination, funding for watershed management activities, staffing and training, interjurisdictional coordination, and watershed land acquisition.

This symbol refers to Fiscal Resources throughout the Plan

3.7.1 Costs and Benefits of Lease and Permit Activities

- Costs and benefits of existing lease/permit activities are difficult to determine accurately. Revenue generation is accurately tracked by the SFPUC, but costs of the lease/permit activities, (e.g., lease administration, staffing, physical improvements required on the land [water consumption, impacts to water quality, additional treatment costs required, impacts to ecological resources, etc.]) are not balanced against the revenue;
- Costs of managing the lease may exceed revenues generated in some cases;
- Costs and benefits of public access activities and related management/monitoring activities (e.g., fire management activities, water quality/ecological monitoring) have not been evaluated;
- Costs related to risk (e.g., water quality, fire etc.) are difficult to quantify;
- Poorly managed recreation and other activities;
- Some lessees are paying a discounted rate for water and are not required to implement water conservation practices;
- Revenue generation and responsible resource management may not be compatible;
- Permit fees do not always cover the costs of permit administration;
- Additional treatment costs related to watershed activities; and
- Any activity generated by the watershed that directly (e.g., chemical spill) or indirectly (e.g., causes erosion) reduces the water supply should be considered a cost.

3.7.2 SFPUC Coordination

- Water system maintenance and improvement activities (e.g., pipeline repair, fence maintenance, road construction and maintenance) are often not coordinated with the LRMS, which leads to inadvertent damage

to watershed resources and associated costs.

3.7.3 Funding for Watershed Management Activities

- Funding for watershed management activities is limited;
- Funding for the staff, training, and equipment required to implement the Plan must be recognized by the SFPUC as a necessity that must be committed to;
- Need to investigate additional watershed management funding sources (e.g., watershed trust fund, user fees, lotteries) as well as cost-saving methods for implementation (e.g., use of volunteer forces);
- The SFPUC may have surplus land not essential to maintaining high water quality, which could be sold and the revenue used to purchase lands which are critical; and
- Resources generated by watershed activities to fund watershed management and maintenance activities and land acquisition.

3.7.4 Staffing and Training

- Need for training of existing SFPUC staff to undertake watershed management activities; and
- Need for additional staff to implement the Watershed Management Plan.

3.7.5 Interjurisdictional Coordination

- Existing trail facilities are not adequately staffed and managed and maintained by San Mateo County Parks Department;
- Inadequate policing/security of watershed by San Mateo County;
- SFPUC staff are consistently pulled off of their responsibilities to fill voids created by the shortage of San Mateo County and Golden Gate National Recreation Area (GGNRA) staff; and
- Need for coordination with the San Mateo County Trails Easement and the GGNRA project liaison.

3.7.6 Watershed Land Acquisition

- SFPUC does not own/manage a small portion of the hydrologic watershed where activities may have an impact on water quality; and
- Inholdings and adjacent lands represent threats to water quality where more intensive development may be allowed.

3.8 Public Awareness and Agency Participation

The following section addresses public awareness needs and management concerns relating to the general public, upstream landowners, and agency participation.

This symbol refers to Public Awareness throughout the Plan

3.8.1 General Public

- Public education is needed to clarify the purpose and vulnerability of the watershed, and their implications in terms of public access. This education should distinguish between public park lands devoted to public recreation purposes and watershed land critical for water supplies and water quality;
- Educational efforts in the use and value of the watershed are needed to increase public support for SFPUC watershed protection efforts (e.g., protection of water quality, water supply, or watershed resources);
- Lack of facilities and resources to educate and interpret watershed values concerning water and natural resources; and
- Coordination with non-profit organizations with similar educational and resource protection goals as the SFPUC may be beneficial to provide educational programs.

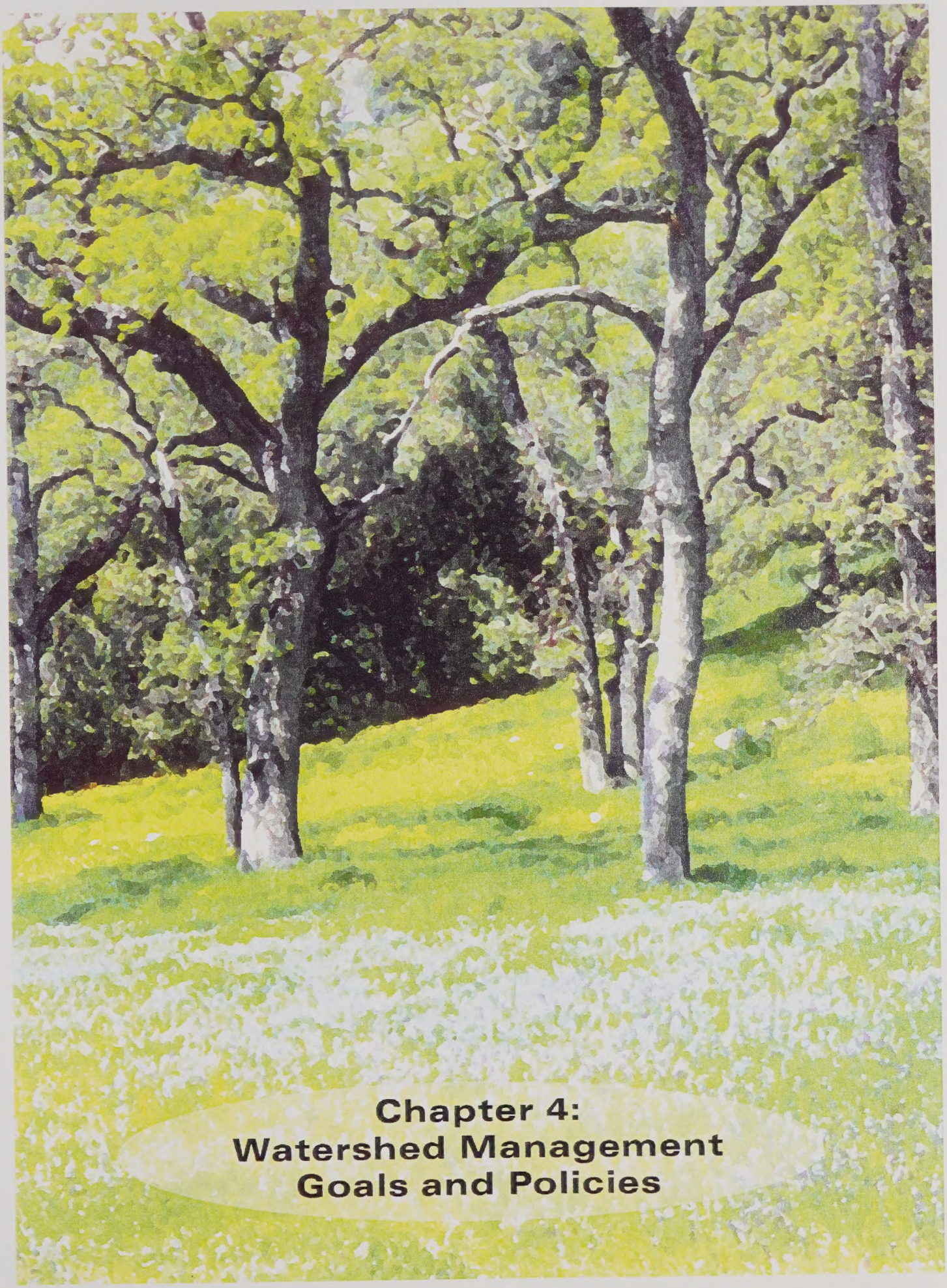
3.8.2 Upstream Landowners

- Lack of awareness by the small number of landowners upstream of SFPUC watershed lands about activities that affect water quality, water quality protection, and improvement practices and procedures.

3.8.3 Agency Participation

- Need for increased emphasis on conservation, reclamation, and reuse of water by various agencies; and
- Need for coordinated, interjurisdictional, land management activities with the following agencies:
  - United States Fish and Wildlife Service - San Francisco garter snake habitat management;
  - Regional Water Quality Control Board - water quality monitoring requirements;
  - California Department of Fish and Game - refuge management, downstream fisheries management (Pilarcitos Creek), and Stream Alteration Agreements;
  - California Department of Forestry and Fire Protection and local fire marshals - fire management and fire response;
  - California Department of Pesticide Regulation - pesticide use;
  - Golden Gate Biosphere Reserve - conservation of biologically valuable areas by designation of "core" area(s);
  - San Mateo County Parks Department - recreation management;

- San Mateo County Agricultural Department - pesticide regulation;
- San Mateo County Firesafe - fire protection and response;
- Various agencies - mutual aid agreements regarding fire response and prescribed burning; and
- Golden Gate National Recreation Area - Scenic and Recreation Easement.



Chapter 4:
Watershed Management Goals and Policies

Chapter 4. Watershed Management Goals and Policies

4.1 Introduction

This chapter identifies the goals and policies for managing the watershed. The goals were established during the course of the planning process and address the principal watershed planning issues and concerns identified in Chapter 3. The policies have been developed from the goals and serve as the framework to guide ongoing decision-making by the SFPUC and other responsible parties.

The watershed management goals include the primary goal, which is to maintain and improve water quality, and six supporting secondary goals. In all management cases, the primary goal must be met first, even if an intended action is focused on a secondary goal. Each goal is represented by an icon. These icons are used throughout this document to indicate that a given policy or management action is derived from and addresses the goal each icon represents.

The policies have been organized into eleven major topic areas:

- Water Quality (WQ)
- Water Supply (WS)
- Vegetation (V)
- Wildlife (W)
- Aquatic Resources (AR)
- Cultural Resources (CR)
- Fire (F)
- Safety and Security (S)
- Watershed Activities (WA)
- Public Awareness (PA)
- Administration and Finance (AF)

Each topic area is referenced by the first letter(s) of each word for easy recognition. Within each topic area, associated policies are numbered.

Watershed Management Goals

Primary Goal

Maintain and improve source water quality to protect public health and safety.

Secondary Goals

Maximize water supply;

Preserve and enhance the ecological and cultural resources of the watershed;

Protect the watersheds, adjacent urban areas, and the public from fire and other hazards;

Continue existing compatible uses and provide opportunities for potential compatible uses on watershed lands, including educational, recreational, and scientific uses;

Provide a fiscal framework that balances financial resources, revenue-generating activities, and overall benefits, and an administrative framework that allows implementation of the Watershed Management Plans; and

Enhance public awareness of water quality, water supply, conservation, and watershed protection issues.

This page intentionally left blank.

4.2 Water Quality (WQ)

Primary Goal: Maintain and Improve Source Water Quality to Protect Public Health and Safety

Maintaining and improving the quality of source drinking water is the primary watershed management goal. The deterioration of water quality can be caused by the effects of poor watershed policies and decision-making associated with the management of natural resources, watershed activities, and other land uses. Problems associated with water quality are generally physical (e.g., particulates and solids), chemical (e.g., synthetic organic compounds [SOCs], THMs, and nutrients), or biological (e.g., microorganisms) in nature. Watershed management policies aim to minimize or reduce water quality problems through the control of erosion, sedimentation, stormwater runoff, the introduction of undesired constituents into the water supply (e.g., pathogens, excess nutrients, disinfection byproduct precursors [DBPs], pesticides, and other hazardous materials), and land ownership and activities.

Water quality policies have been organized into the following topic areas

- Physical, Chemical, and Biological Considerations
- Roads, Trails, and Rights-of-Way
- Erosion, Sedimentation, and Runoff
- Coordination, Collaboration, and Land Management
- Wetlands, Riparian Areas, and Stream Channels
- Access, Restrictions, and Enforcement
- Monitoring

Primary Goal: "... Improve Water Quality to Protect Public Health and Safety"

Physical, Chemical, and Biological Considerations

Policy WQ1 Prevent the introduction of pesticides and chemicals into the water supply by minimizing and controlling the use of these constituents, and implementing alternative methods for pest control, where feasible, and by controlling chemical use and requiring that non-toxic, non-persistent alternatives be used where practical.

Policy WQ2 Restrict aerial broadcast spraying of chemical pesticides as a means of vegetation management and pest control. Ultra-low volume (ULV) aerial spraying of biorational controls such as *Bacillus thuringiensis israelensis* (a bacterium) and *Lagenidium giganteum* (fungal parasite), which are host-specific agents (affecting mosquito larvae), may be allowed if consistent with the CCSF City Pesticide Ordinance (No. 274-97) and the SFPUC Integrated Pest Management Plan (IPMP) since they do not have the side effects of persistence, accumulation, and non-selective mortality associated with chemical pesticides.

Crystal Springs Reservoir

Policy WQ3 Minimize nutrient loading to the water supply.

Policy WQ4 Minimize the introduction of DBPs to the water supply.

Policy WQ5 Minimize the risk of metals leaching to waterbodies and prohibit dumping of metals within the watershed.

Policy WQ6 Prevent the introduction of asbestos fibers into the water supply.

Policy WQ7 Prevent the potential for hazardous materials spills into the water supply by controlling their use and transport within the watershed.

Policy WQ8 Minimize the introduction of pathogens to the water supply.

Roads, Trails, and Rights-of-Way

Policy WQ9 Minimize, and where possible prohibit, the construction of new roads and trails.

Policy WQ10 Where new roads or trails are required, locate and design them to follow natural topography, minimize steep slopes and stream crossings, avoid large cut and fill road designs, minimize excavation, and avoid highly erodible areas.

Policy WQ11 Minimize and where possible restrict the construction of new roads or access easements through watershed lands to serve new development not in SFPUC ownership to areas of low vulnerability.

Policy WQ12 Minimize and where possible restrict new easements and rights-of-way through the watershed land to areas of low vulnerability. Allow only existing uses, those within existing alignments, or those which do not pose a threat to water quality.

Policy WQ13 Optimize the existing road system such that there are no more roads than necessary for operations and maintenance purposes.

Erosion, Sedimentation, and Runoff

Policy WQ14 Minimize, and where possible prohibit, land uses and activities that have the potential to cause erosion, sediment generation, and stormwater runoff.

Policy WQ15 Where suitable, use sedimentation basins to control the effects of erosion and sediment transport.

Policy WQ16 Minimize and where possible prohibit the creation of impervious surfaces on watershed lands.

Policy WQ17 Minimize vehicle-related contaminants in runoff from road, parking lots, maintenance facilities, and other sources.

Coordination, Collaboration, and Land Management

Policy WQ18 Minimize and where possible prohibit the construction of new on-site waste treatment systems to serve facilities or other new developments on watershed lands.

Policy WQ19 Coordinate water quality concerns with fire management activities to prevent erosion.

Policy WQ20 Foster interagency agreements with adjacent jurisdictions to limit new construction on non-SFPUC lands within the hydrologic watershed to minimize adverse effects to water quality.

Policy WQ21 Actively seek acquisition of or purchase of conservation easements over lands within the hydrologic watershed that are critical to water quality and supply that are not in SFPUC ownership. Encourage the use of applicable Plan policies and management actions to manage lands under a conservation easement.

Policy WQ22 Prohibit the sale or exchange of SFPUC lands within the watershed that are critical to water quality, supply, and SFPUC operations.

Policy WQ23 Ensure that CalTrans conducts regular maintenance and monitoring of its sedimentation basins and turbid water collection basins.

Policy WQ24 Actively participate in local and regional government planning processes to keep abreast of new projects that may affect SFPUC lands and water quality.

Wetlands, Riparian Areas, and Stream Channels

Policy WQ25 Wherever possible, preserve and protect stream channels and banks to protect water quality by maintaining or improving channel stability and reducing bank erosion.

Policy WQ26 Prohibit unauthorized fill or excavation activities on wetlands, riparian zones, etc. Achieve regulatory compliance for maintenance activities within wetland and riparian areas.

Access, Restrictions, and Enforcement

Policy WQ27 Prohibit swimming, boating, and windsurfing and other body contact activities in all water sources.

Policy WQ28 Strictly control public access to minimize adverse effects to water quality.

Policy WQ29 Actively enforce penalties and other standard enforcement procedures on activities that adversely affect water quality.

Monitoring

Policy WQ30 Require intensive management and ongoing monitoring of land

Pilarcitos Reservoir

uses and activities that could result in the introduction of pathogens into the water supply.

Policy WQ31 Require ongoing water quality monitoring of reservoirs and tributaries to detect decreases in water quality related to watershed activities.

4.3 Water Supply (WS)

Secondary Goal: Maximize Water Supply

To achieve this goal, policies have been developed that focus on a number of objectives: including: maximizing reservoir and groundwater storage, preventing interruptions to water supply, minimizing water use within the watershed through conservation and reclamation, and enhancing the water yield of the watershed.

Water supply polices have been organized into the following topic areas:

- Water Storage
- Conservation and Reclamation
- Water Quality and Yield
- Water Releases

Water Storage

Policy WS1 Maximize reservoir storage capacities by minimizing sedimentation in reservoirs.

Conservation and Reclamation

Policy WS2 Require conservation practices, where appropriate, to minimize water use within the watershed.

Policy WS3 Require the use of reclaimed water, where appropriate, to minimize water use within the watershed.

Water Quality and Yield

Policy WS4 Prevent a reduction in the water supply by reducing risks to water quality.

Policy WS5 To ensure adequate water quality protection, require that all reclaimed water used on the watershed meet Department of Health Services (DHS)/Regional Water Quality Control Board (RWQCB) requirements.

Policy WS6 Enhance the water yield of the watershed, where compatible with other natural resource management policies while prohibiting activities that could result in adverse effects on water quality.

Water Releases

Policy WS7 Minimize the release of water that cannot be recaptured.

Secondary Goal: "Maximize Water Supply"

This page intentionally left blank.

4.4 Vegetation (V)

Secondary Goal: Preserve and Enhance the Ecological and Cultural Resources of the Watershed

Several policies addressing vegetation management have been developed to accomplish this goal. These policies aim to protect, preserve, enhance, and restore significant plant environments, foster botanical investigations for the benefit of SFPUC, control the use of chemicals, and identify potential adverse impacts to vegetation caused by proposed projects.

Vegetation policies have been organized into the following topic areas:

- Pest Management and Chemical Use
- Control of Invasive Species and Noxious Weeds
- Special Status Plant Communities
- Specialized Habitat Considerations
- Impact Assessment for Future Projects

Pest Management and Chemical Use

Policy V1 Manage an Integrated Pest Management (IPM) program, under the responsibility of an SFPUC licensed Pest Control Advisor (PCA) in accordance with the City and County of San Francisco's City Pesticide Management Plan Ordinance (No. 274-97) and the SFPUC IPMP to restrict, and where possible eliminate, the use of chemical applications (including pesticides or other poisons) that adversely affect water quality, accumulate in the food chain, and/or have adverse effects on ecological function and reproductive success of wildlife and fish. Require that the most appropriate method of pest control be used to achieve desired objectives from a range of treatment alternatives.

Policy V2 Focus chemical use reduction efforts in areas where they are currently being used most intensively.

Control of Invasive Species and Noxious Weeds

Policy V3 Prohibit the planting of exotic plant species.

Policy V4 Reduce the occurrence of noxious weeds and invasive exotic plant species through eradication and control practices.

Special Status Plant Communities

Policy V5 Protect, preserve, and enhance significant botanical resources, including populations of rare, threatened, endangered, and sensitive plant species and their habitat.

Policy V6 Encourage and allow investigations of special status plants and communities on the watershed to further

Secondary Goal: "Enhance the Ecological Resources of the Watershed"

Douglas Fir Forest

the SFPUC's understanding of the watershed's vegetation and its condition.

Specialized Habitat Considerations

Policy V7 Protect and restore unique, local, and/or indigenous plant species to maintain biodiversity and specialized habitat values.

Policy V8 Preserve the biodiversity and genetic integrity of the watershed plant communities, where possible.

Policy V9 Protect, conserve, and enhance wetlands and riparian communities.

Policy V10 Manage grasslands and rangelands to balance, wherever possible, the support of wildlife habitat values, the restoration of native perennial species, and the reduction of fuel loads and noxious weeds.

Policy V11 Manage shrub communities to reduce fuel loads, prevent soil erosion and sedimentation, improve wildlife habitat access and use, and control invasive plants.

Policy V12 Manage woodlands and forests to maintain healthy, vigorous, and diverse stands with a multiplicity of age and size classes.

Policy V13 Give priority to restoring degraded habitat rather than creating new habitat, with the exception of sites for wetland mitigation banking where new wetland habitat should be created.

Policy V14 Use controlled fire to enhance natural vegetation regimes and enhance wildlife habitat.

Impact Assessment for Future Projects

Policy V15 Require a site-specific analysis prior to proposed facility and infrastructure projects, operations and maintenance activities, and proposed construction projects to determine the presence of sensitive vegetation resources and the potential effects of the activity on the resource. Analyses shall be conducted in accordance with all applicable State and Federal laws, statutes, and guidelines.

4.5 Wildlife (W)

Secondary Goal: Preserve and Enhance the Ecological and Cultural Resources of the Watershed.

Wildlife policies have been developed as part of this Plan to protect and enhance the wildlife resources of the watershed. These policies focus on protecting, conserving, enhancing, and restoring significant wildlife resources; eradicating pest species; controlling public access; identifying potential adverse impacts to wildlife caused by future projects; and fostering wildlife investigations and monitoring activities for the benefit of the SFPUC.

Wildlife policies have been organized into the following topic areas:

- Protection and Enhancement of Wildlife Resources and Habitat
- Pest Management and Control
- Access, Restriction, and Management
- Impact Assessment for Future Projects
- Compliance and Coordination
- Studies and Monitoring

Protection and Enhancement of Wildlife Resources and Habitat

Policy W1 Protect high Ecological Sensitivity Zones (ESZs), including host plant communities supporting populations of State and Federally listed animals, using sound scientific methods.

Policy W2 Protect, conserve, and enhance existing native wildlife populations and their habitat.

Policy W3 Preserve the biodiversity and genetic integrity of local wildlife populations, where possible.

Policy W4 Protect, conserve, and enhance ecosystems that provide important wildlife habitat values.

Policy W5 Protect, preserve, and monitor important habitat features such as mature trees with cavities, downed trees, snags, rock outcrops, cliff ledges, and caves for wildlife use, where they do not conflict with health and safety issues.

Policy W6 Maintain the integrity of the watershed creeks to retain their value as riparian ecosystems and wildlife corridors.

Pest Management and Control

Policy W7 Control, and where possible eradicate, pest species, including harmful, feral, or introduced animals.

Black-Tailed Deer

Access, Restriction, and Management

Policy W8 Restrict public and control staff access to high ESZs to minimize human disturbance to sensitive wildlife and their habitat.

Impact Assessment for Future Projects

Policy W9 Require a site-specific analysis prior to proposed facility and infrastructure projects, operations and maintenance activities, and proposed construction projects to determine the presence of sensitive wildlife resources and the potential effects of the activity on the resource. Analyses shall be conducted in accordance with all applicable State and Federal laws, statutes, and guidelines.

Policy W10 Protect the integrity of wildlife movement corridors by properly siting infrastructure, facilities, and public access features to maintain landscape connectivity, and minimize fragmentation and degradation of wildlife habitat.

Compliance and Coordination

Policy W11 Achieve appropriate compliance, when watershed activities and operations affect regulated and legally protected species, by implementing comprehensive wildlife protection programs (such as habitat conservation plans), obtaining appropriate permits, and establishing conservation easements.

Studies and Monitoring

Policy W12 Encourage and allow investigations of wildlife, including the distribution and occurrence of special status species and their habitats, on the watershed to further the SFPUC's understanding of the watershed's wildlife resources and their condition.

Policy W13 Monitor the short- and long-term effects of wildlife management programs for relative effectiveness and benefit to ecological integrity.

4.6 Aquatic Resources (AR)

Secondary Goal: Preserve and Enhance the Natural and Cultural Resources of the Watershed.

Aquatic resource policies have been developed as part of this Plan to preserve and enhance the aquatic resources of the watershed. These policies aim to protect, preserve, enhance, and restore significant aquatic resources; identify potential adverse impacts to aquatic resources caused by future projects; and manage the aquatic resources in cooperation with other agencies and groups.

Aquatic resource policies have been organized into the following topic areas:

- Protection and Enhancement of Aquatic Resources and Habitat
- Water Quality
- Fisheries
- Impact Assessment for Future Projects
- Management and Coordination
- Mitigation Banking

Protection and Enhancement of Aquatic Resources and Habitat

Policy AR1 Conserve, protect, and enhance the biodiversity, genetic integrity, and habitat of the watershed's aquatic resources.

Policy AR2 Protect special status species and adhere to applicable State and Federal management regulations.

Policy AR3 Control populations of predaceous exotic aquatic species that threaten special status species.

Policy AR4 Promote healthy, diverse riparian and wetland vegetation to provide shade and cover necessary for fish spawning, rearing, and feeding areas.

Water Quality

Policy AR5 Minimize and where possible eliminate the introduction of chemicals (e.g., copper sulphate, chlorine, etc.) into reservoirs and streams to protect aquatic resources.

Fisheries

Policy AR6 Prohibit artificial stocking or other introduction of non-native fish into existing watershed aquatic habitat to conserve native biodiversity.

Impact Assessment for Future Projects

Policy AR7 Require a site-specific analysis prior to proposed facility and infrastructure projects and proposed construction projects to determine the presence of sensitive aquatic resources and the potential effects of the project on aquatic resources. Analyses will be conducted in accordance with all applicable

State and Federal laws, statutes, and guidelines.

Management and Coordination

Policy AR8 Manage the watershed's aquatic resources in cooperation with State, Federal and local agencies, and scientific institutions.

Policy AR9 Cooperate with stream management organizations to protect and enhance aquatic habitat of streams in the hydrologic watershed.

Policy AR10 Prohibit selected classes of activities, or limit land use type, duration and intensity within the high water quality vulnerability zones, consistent with other management elements in this Plan.

Mitigation Banking

Policy AR11 Promote wetland mitigation banking to offset impacts to wetlands from SFPUC activities on SFPUC lands.

4.7 Cultural Resources (CR)

Secondary Goal: Preserve and Enhance the Natural and Cultural Resources of the Watershed

Secondary Goal: "Preserve the Cultural Resources of the Watershed"

Policies addressing cultural resource management have been developed as part of this Plan to protect and enhance the watershed's cultural resources. These policies aim to protect and preserve historic structures and features, require consultation with Native American organizations, monitor known cultural resource sites, identify potential adverse impacts to cultural resources caused by future projects, and enhance knowledge of existing cultural resources within the watershed.

Cultural resource policies have been organized into the following topic areas:

- Preservation and Protection of Cultural Resources
- Coordination and Consultation
- Monitoring, Future Studies, and Education
- Impact Assessment for Future Projects

Preservation and Protection of Cultural Resources

Policy CR1 Preserve, where possible, historic structures and features and protect them from deterioration, removal, demolition, vandalism, or severe alterations.

Policy CR2 Provide the highest level of priority to the protection and preservation of cultural resources eligible for or listed on the National Register of Historic Places or the California Register of Historic Places.

Policy CR3 Provide appropriate and adequate protection for cultural resource sites subject to public access.

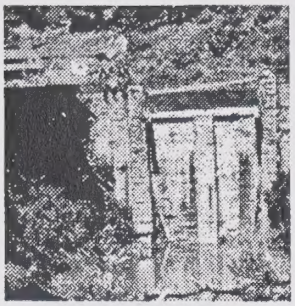
Policy CR3 Protect submerged cultural resources from damage and vandalism when exposed in reservoirs during low water conditions.

Coordination and Consultation

Policy CR5 Consult and coordinate with appropriate Native American organizations regarding cultural resource preservation and protection, when appropriate.

Policy CR6 Provide federally recognized Native American organizations that have a historic link to the watershed access to burial grounds and sacred sites used for traditional ceremonies or rites, if practicable.

Policy CR7 Restrict circulation of known cultural resource site descriptions to appropriate watershed management



Early Stone Dam

personnel and qualified professionals only to avoid adverse effects on resources.

Monitoring, Future Studies, and Education

Policy CR8 Enhance knowledge of cultural resources by encouraging, where feasible, the evaluation of archaeological sites, historic structures, and historic/archaeological features.

Impact Assessment for Future Projects

Policy CR9 Require a site-specific analysis prior to, as well as ongoing monitoring of, all facility and infrastructure projects, operations and maintenance activities, and proposed construction projects which involve disturbance to or the movement of soils to determine the presence of sensitive cultural resources and the potential effects of the activity on known and potentially occurring cultural resources. Analyses shall be conducted in accordance with all applicable State and Federal laws, statutes, and guidelines and conducted by a certified and trained archeological specialist.

4.8 Fire (F)

Secondary Goal: Protect the Watersheds, Adjacent Urban Areas, and the Public From Fire and Other Safety Hazards

Fire is a particular concern on the Peninsula Watershed, since the watershed is near populated urban areas and the buildup of fuels can pose a risk to public safety. A wildfire could have tremendous impacts on water quality, water supply, and ecological and cultural resources, as well as to the aesthetics of the watershed and to adjacent residential areas. If properly managed, however, use of fire as a vegetation management tool can be both beneficial and economical to the watershed ecosystem and have little impact on water quality, water supply, and aesthetics. To protect against wildfire hazards, policies focus on supporting fire pre-suppression efforts including fuel management activities and prescribed burns, restricting public access during high fire hazard periods, regulations compliance, staff training, controlling fire suppression activities, and using grazing as a fire management tool.

Fire policies have been organized into the following topic areas:

- Protection of Natural and Cultural Resources
- Fire Pre-Suppression
- Fire Suppression
- Access Control and Management
- Coordination and Monitoring
- Fuel Management

Protection of Natural and Cultural Resources

Policy F1 Conduct fire defense, management, and suppression activities in such a manner that natural and cultural resources are adequately protected from damage.

Fire Pre-Suppression

Policy F2 Prohibit smoking, fireworks, and other activities likely to cause a fire, as well as equipment that has not been properly equipped, serviced, and maintained.

Policy F3 Require all lessees and permittees to conduct fire hazard reduction activities.

Fire Suppression

Policy F4 Suppress fires that threaten life, private property, and/or public safety.

Policy F5 Provide adequate water supplies, road infrastructure, and equipment to allow fire personnel to effectively respond to and suppress fires on the watershed.

Secondary Goal: "Protect the Watersheds From Fire"

Controlled Burn

Policy F6 Provide staff training to adequately detect, respond to, suppress, and report on fires on SFPUC lands.

Access Control and Management

Policy F7a Prohibit unsupervised access to the watershed in all areas except the Fifield/Cahill Ridge Trail to reduce the risk of fire (to apply if Policy WA66a, b, or c is adopted).

Policy F7b Prohibit unsupervised access to the watershed to reduce the risk of fire (to apply if Policy WA66d is adopted).

Policy F8 Restrict access to the watershed, implement strict fire hazard reduction practices, and initiate the public information processes during periods of extreme fire hazard.

Coordination and Monitoring

Policy F9 Coordinate fire management activities with the CDF and other mutual-aid fire protection agencies.

Policy F10 Monitor the effects of fire management activities.

Fuel Management

Policy F11 Use prescribed fire to control fuels, where appropriate.

Policy F12 Require that fuel treatment activities be conducted in an ecologically sound manner to the greatest extent possible and that when prescribed burning is undertaken, it strives to mimic natural fire regimes.

Policy F13 Actively manage fuels in a timely manner to reduce ignition potential, minimize surface fire spread/compartmentalize fires, reduce/minimize fire intensity, and reduce ember production and distance cast.

Policy F14 Focus fuel management activities adjacent to developed areas, watershed facilities and improvements, sensitive natural and cultural resources, major egress and emergency ingress routes, areas of crown fire potential, and potential and existing fuel breaks.

4.9 Safety and Security (S)

Secondary Goal: Protect the Watersheds, Adjacent Urban Areas, and the Public From Fire and Other Safety Hazards

Secondary Goal: "Protect the Public From Safety Hazards"

Policies addressing safety concerns focus on procedures that will help prevent safety hazards from occurring on the watershed. These policies aim at reducing the likelihood and/or safety risk associated with seismic and geohazards, public access, and hazardous material spills or other emergency conditions and also address the role of SFPUC staff as both a security force and an emergency response team.

Safety and security policies have been organized into the following topic areas:

- Public Access
- Seismic, Geological, and Hazardous Material Risk
- Response, Monitoring, and Enforcement Procedures
- Liability Issues

Public Access

Policy S1 Require that new or expanded recreation activities address and accommodate public safety issues.

Policy S2 Maintain and enforce a safety and security program for the watershed.

Policy S3 Reduce the likelihood of dangerous condition liability on the watershed through periodic safety inspections of improvements and facilities used by the public.

Seismic, Geological, and Hazardous Material Risk

Policy S4 Minimize damage from future seismic hazards by avoiding construction of facilities in active fault zones and traces, where feasible.

Policy S5 Minimize damage from potential mass movement hazards by avoiding construction or other disturbances in known dormant landslides and on slopes greater than 30 percent, without proper engineering.

Policy S6 Conduct (for SFPUC-owned) and require (for easements) inspection of facilities and utilities near active landslide areas and fault traces following earthquakes and slope failures to assess their stability and integrity, and complete repairs or further monitoring as needed to prevent geohazards.

Policy S7 Require adequate seismic and static geohazards engineering studies for proposed facilities, infrastructure, and utilities easements within the watershed.

Policy S8 Require that utility pipelines within the watershed meet current seis-

mic standards and comply with applicable hazardous materials regulations.

Response, Monitoring, and Enforcement Procedures

Policy S9 Adhere to identified appropriate response procedures during the following high priority emergency situations:

A. Toxic spills and leaks
B. Pipeline damage
C. Damaged electric transmission and distribution lines
D. Wildfire
E. Flooding/inundation
F. Geologic and soil related disturbance
G. Human injury accidents.

Policy S10 Conduct ongoing boat patrols of watershed reservoirs for surveillance and monitoring purposes.

Policy S11 Members of the LRMS staff, with cooperation from other authorized law enforcement agencies, shall strictly enforce all federal, state, county, and watershed policies, rules, and regulations to minimize illegal dumping, poaching, and other trespass and illegal activities on the watershed.

Liability Issues

Policy S12 Require that the types and appropriate levels of insurance coverage held by lessees and permitees be commensurate with the amount of risk and potential liability with which the SFPUC is faced.

Policy S13 Liability associated with public access on lands leased/managed by SMCPD shall be the responsibility of said agency. This provision shall be incorporated into all existing and future lease/management agreements.

Policy S14 Work with other local agencies to acquire downstream flood and conservation easements over lands where flooding poses significant risks to life and property, and to enhance habitat.

4.10 Watershed Activities (WA)

Secondary Goal: Continue Existing Compatible Uses and Provide Opportunities for Potential Compatible uses on Watershed Lands, Including Educational, Recreational, and Scientific Uses

Policies have been developed to address the multitude of existing and potential future activities on the watershed. The policies focus on public access to and use of the watershed; SFPUC operations and maintenance; and coordination with other applicable agencies and organizations.

Watershed activity policies have been organized into the following topic areas:

- Prohibitions and Restrictions on New Activities/Development
- Activities Allowed by Permit
- Recreational Access
- Review Process for Proposed Plans and Projects
- Requirements for New Facilities, Projects, Activities, and Development
- SFPUC Operations and Maintenance Activities
- Evaluation of Existing Activities
- Coordination
- Southern Peninsula Watershed Golf Course
- Fifield/Cahill Ridge Trail

Prohibitions and Restrictions on New Activities/ Development

Policy WA1 Prohibit activities that are detrimental to watershed resources. Prohibited activities are as follows:

A. The unauthorized take or possession of fish, amphibians, birds, or invertebrates.

B. The unauthorized take of vegetation, including flowers, foliage, seeds, fruits, and berries of plants as well as leaf mold, humus, grass, turf, shrubs, cones, ferns, mushrooms, and deadwood.

C. Swimming and body contact with the water by humans and domestic animals.

D. Walking of domestic pets, with the exception of guide dogs, search and rescue dogs, and police dogs.

E. Boating with the exception of SFPUC maintenance, operations, and monitoring activities and in selected emergency storage reservoirs.

F. Activities which result in direct public access to reservoirs and tributaries (e.g., fishing, new trails at or near shoreline).

G. Smoking, campfires, and fireworks.

H. Dumping and littering.

Secondary Goal: "Provide Opportunities for Compatible Uses on Watershed Lands"

I. Use of motorized vehicles with the exception of SFPUC maintenance and operations personnel and their agents and, in an emergency, by response agencies and their agents.
J. Use of septic systems on SFPUC lands.
K. Use of the watershed during periods of extreme fire weather conditions.
L. Hunting.
M. All alcoholic beverages.
N. Release and supplemental feeding of domestic cats, dogs, and other domestic animals on the watershed.
O. Use of firearms and bows and arrows.
P. Fishing.
Q. Mobile vendor activities.
R. Unsupervised public access to existing internal roads/fire roads and trails with the exception of Fifield/ Cahill Ridge Trail as described in Policies WA66a and b.
S. Camping.
T. Off-trail use by recreational users.
U. Unauthorized construction of new trails.
V. Mountain biking, except on specifically designated trails.

Policy WA2 Prohibit the construction of new trails and unsupervised access to existing roads and trails not addressed in this Plan.

Policy WA3 Prohibit the construction of new pipelines through the watershed for the transmission of gas, oil, or other hazardous substances.

Policy WA4 Prohibit all commercial and non-SFPUC residential development not addressed in this Plan on the watershed lands.

Policy WA5 Prohibit instream mining and/or development along reservoir shorelines and tributary streams.

Policy WA6 Restrict new utility lines proposed on the watershed for the transmission of or communications to existing utility corridors, and require that new power lines be buried, where feasible. All proposed alignments shall undergo a scenic impact analysis.

Policy WA7 Limit the number of facilities requiring construction of new waste disposal systems on SFPUC lands to those that are essential where possible. Require state-of-the-art waste systems on new or existing facilities.

Policy WA8 Private concession sales at SFPUC recreation sites shall be limited to those items necessary for the enjoyment and use of recreation opportunities at the site, including usage fees, food and beverages, and recreational equipment rental.

Policy WA9 Require that new communication facilities (e.g., antennae, satellite dishes, cell towers, etc.) proposed on the watershed which require open and unobstructed sites be sited to minimize the impact to visual resources and wherever possible be co-located with existing facilities. If new facilities require addi-

tional locations, require that viewshed studies be conducted to minimize, eliminate, or conceal the violations of scenic values.

Activities Allowed by Permit

Policy WA10 The activities listed below shall be allowed on the watershed by SFPUC permit only. Unless otherwise stated, permits shall be limited to one day per permit and for day use hours only. Activities allowed by permit only are:

A. Overnight use.
B. Off-trail activities.
C. Off-road vehicle use except for emergencies or by SFPUC maintenance and operations personnel.
D. Blasting of explosives.
E. Open fires.
F. Trapping and release of introduced fish and wildlife into the watershed.
G. Collection of plant or animal specimens.
H. Use of Pulgas Water Temple for wedding ceremonies, lectures, meetings, etc.
I. Collection of State game or State protected fishery resources.
J. Collection of Federally regulated or protected fish species.
K. Supervised public access to existing internal roads/fire roads and trails.
L. Research/scientific study by non-SFPUC personnel.
M. Educational activities.
N. Hunting to control pest species and feral animals.
O. Removal of vegetation, including timber harvest and/or salvage, related to natural resource management activities or to meet fire management goals.

Policy WA11 Allow access by permit to select areas of the watershed generally closed to the public for scientific research by institutions, agencies, and groups which is compatible with water quality protection and all applicable watershed management goals and policies. Research activity permits shall include:

A. Permits for use by qualified individuals or groups for the sole purpose of conducting research pertinent to the watershed.
B. Research may include, but shall not be limited to: water quality monitoring; botanical and wildlife studies; geophysical, paleontological, archaeological, and cultural research; restoration and enhancement efforts; and analysis of watershed ecological systems and processes.
C. Researchers shall furnish SFPUC with a copy of all significant resource data, GIS files, results, theses, dissertations, studies, and reports for inclusion in the Watershed Center.
D. Researchers shall provide interpretive information for use in educational programs, when appropriate.
E. Permit duration shall be dependent on specific research requirements and granted on an individual and project-specific basis.

Policy WA12 Allow supervised access by permit to select areas of the water-

Scientific Study

Guided Tour

shed generally closed to the public for educational activities. Educational activity permits shall include:

A. Permits for groups with the purpose of educating persons on aspects inherent to the watershed.
B. Educational activities may include, but shall not be limited to: wildlife and wildflower observation, watershed ecological processes analysis, and volunteer restoration and enforcement efforts.
C. These permits shall be limited to day use only.
D. Groups shall be limited to no more than 25 persons.

Recreational Access

Policy WA13 Proposed recreation activities shall be compatible with their landscape setting, shall not adversely affect watershed resources, and shall comply with the goals and policies in this Plan.

Policy WA14 New recreation and public access activities shall be resource-based, outdoor recreation opportunities, where possible. Resource-based recreation includes uses that are integrally dependent upon the inherent natural, scenic, and/or cultural resources present, but do not adversely affect those resources upon which they depend. For the Peninsula Watershed, this includes hiking, nature study, wildlife viewing, sightseeing, and visiting education centers.

Policy WA15 Limit, where possible, open public access to recreational trails to the periphery of the watershed to minimize disturbance to sensitive wildlife and vegetation communities, reduce chance of fire ignition, minimize spread of weed propagules, and cause the least disruption to wildlife movement resulting from trailside fencing.

Policy WA16 Inform all individuals allowed entry into the watershed, either by permit or open access, of the watershed's primary purpose and the rules and regulations governing watershed activities.

Policy WA17 All individuals and groups granted permits to watershed lands shall be charged user fees to cover the operational costs of the Watershed Information and Permit Reservation System and other SFPUC costs associated with the use of SFPUC facilities and backcountry access.

Policy WA18 Manage a volunteer docent program to accommodate supervised access to the watershed.

Review Process for Proposed Plans and Projects

Policy WA19 To ensure that all future land management decisions and uses remain consistent with the goals and policies set forth in this plan, all proposed plans and projects on the watershed shall be reviewed according to the process illustrated in Figure 4-1, Review Process for Proposed Plans and Projects. All pro-

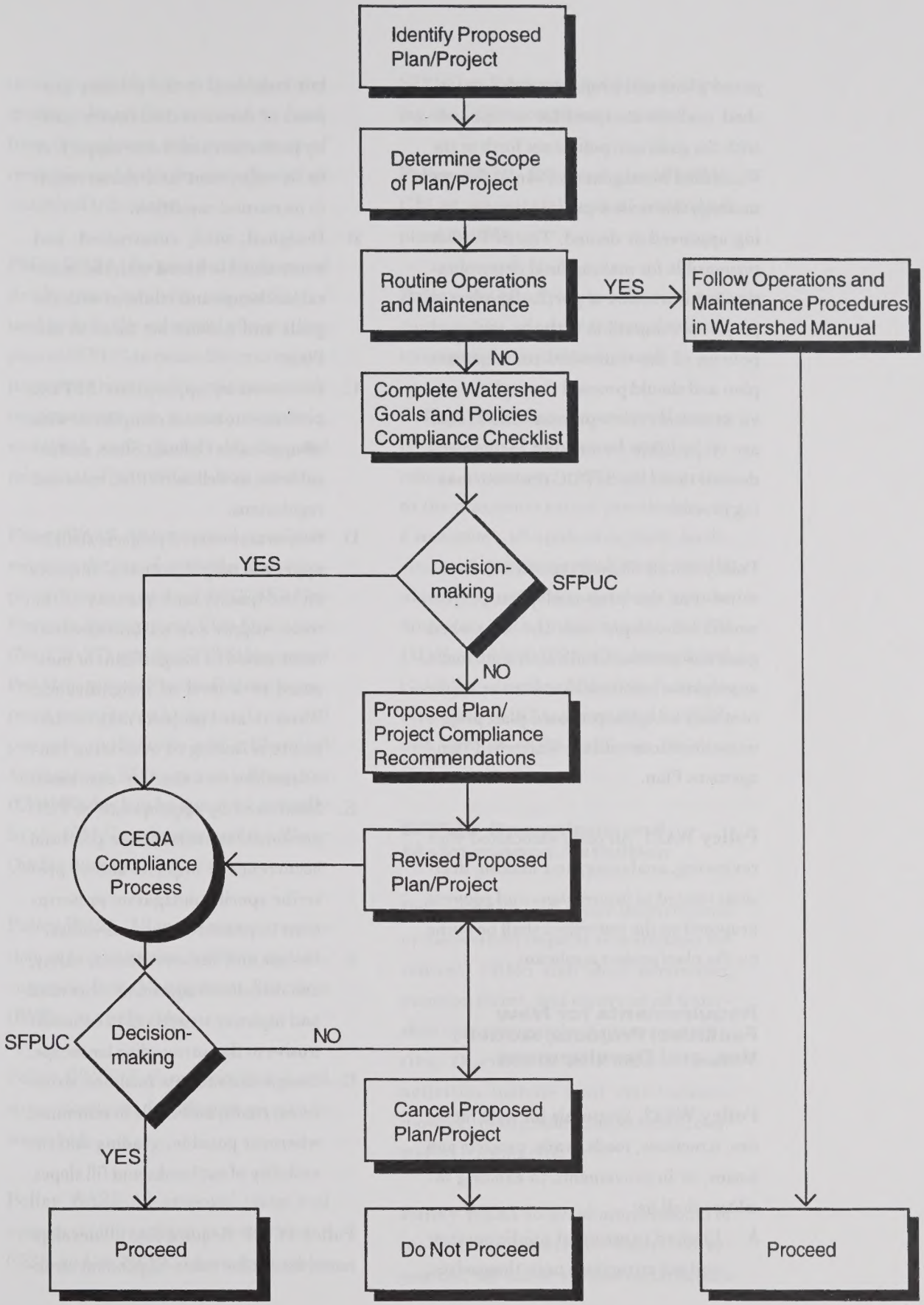


Figure 4-1 Review Process for Proposed Plans and Projects

posed plans and projects on the watershed shall be analyzed for compliance with the goals and polices set forth in the Watershed Management Plan and must undergo this review process prior to being approved or denied. The SFPUC is responsible for making final determination as to whether a particular plan or project is compatible with the goals and policies of the watershed management plan and should proceed through the environmental review process. LRMS staff are responsible for making recommendations to aid the SFPUC decision-making process.

Policy WA20 Should the SFPUC determine that the proposed plan/project would not comply with the watershed goals and policies, LRMS staff shall make appropriate comments so that the applicant may bring the proposed plan/project into compliance with the Watershed Management Plan.

Policy WA21 All costs associated with reviewing, analyzing, and making decisions related to future plans and projects proposed on the watershed shall be borne by the plan/project applicant.

Requirements for New Facilities, Projects, Activities, and Development

Policy WA22 Proposals for new facilities, structures, roads, trails, projects and leases, or improvements to existing facilities shall be:

A. Limited to essential public services and not attractions unto themselves, but incidental to the primary purposes of the watershed (water quality protection and water supply), or to its enjoyment and conservation in its natural condition.
B. Designed, sited, constructed, and maintained to blend with the natural landscape and conform with the goals and policies set forth in this Plan.
C. Reviewed by appropriate SFPUC personnel to ensure compliance with all applicable Federal, State, and local laws, as well as SFPUC rules and regulations.
D. Non-water related projects shall be approved only if potential impacts on the quality and quantity of the water supply and natural environment would be insignificant or mitigated to a level of insignificance. Water related projects may be subject to a finding of overriding considerations on a case-by-case basis.
E. Monitored by appropriate SFPUC personnel to evaluate the potential occurrence of impacts and to prescribe specific mitigation prescriptions to protect watershed values.
F. Design and site overpasses, safety, and directional signs and other road and highway structures to be unobtrusive to the surrounding landscape.
G. Design and site new facilities, structures, roads, and trails to minimize, wherever possible, grading and the visibility of cut banks and fill slopes.

Policy WA23 Require that all development, except for water-dependent struc-

tures, be excluded from the high water quality vulnerability zone and set back from the ordinary high water mark of reservoirs and from the centerline of all watershed tributaries.

Policy WA24 Require that all proposed development involving any grading of land include the submittal of a grading plan to SFPUC to retain the existing topography where feasible, minimize grading, minimize the impacts on scenic, ecological, and cultural resources, and minimize off-site soil loss from erosion.

Policy WA25 All lessees and permittees requiring the use of pesticides shall comply with the provisions of the CCSF's City Pesticide Management Plan Ordinance (No. 274-97) and the SFPUC Integrated Pest Management Plan and submit a proposed pesticide use budget and record of pesticide applications and a Chemical Application Management Program (CHAMP), both to be approved annually by the IPM Coordinator and the Water Quality Bureau.

Policy WA26 All maintenance, operation, and construction activities shall incorporate Best Management Practices (BMPs), as applicable.

Policy WA27 Enforce strict design and siting standards for all signage on the watershed.

Policy WA28 All proposed plans and projects shall be subject to review under CEQA and/or NEPA, where applicable. SFPUC staff are responsible for overseeing the CEQA compliance process.

Policy WA29 Require the use of LRMS GIS as an integral part of watershed planning efforts.

Policy WA30 Prior to initiating new construction, consider re-use of existing structures for departmental uses.

Policy WA31 Provide universal access in the design of all new and modified facilities, structures, trails, and programs to the maximum extent practicable. At a minimum, all applicable trails, facilities, and programs shall meet legally mandated accessibility standards (per the Americans with Disabilities Act of 1990 [ADA], and the 1991 ADA Accessibility Guidelines; Section 504 of the Rehabilitation Act of 1973, as amended in 1978; and Title 24 of the California Building Code).

SFPUC Operations and Maintenance Activities

Policy WA32 To avoid unintentional or inadvertent impacts to watershed resources, LRMS staff shall administer, manage, direct, and supervise all watershed operations and maintenance activities. Operations and maintenance activities include road maintenance, mowing, road grading, slide repair, controlled burning, etc.

Policy WA33 To avoid unintentional or inadvertent impacts to watershed resources, all water system maintenance

activities should be handled in an advisory fashion, with consultation and concurrence of LRMS staff. Supervision and project management of these projects should be delegated to SFPUC staff (e.g., plumbers, resident engineers, or project managers) who are specially trained in watershed protection practices.

Evaluation of Existing Activities

Policy WA34 Periodically evaluate ongoing and proposed activities for compatibility with the goals of this Plan.

Coordination

Policy WA35 Review and/or participate in comprehensive land management planning efforts on adjacent lands to ensure that land use decisions and activities are compatible with protection of the watershed.

Southern Peninsula Watershed Golf Course

Policy WA36 Consider a new 18-hole golf course only on the site termed the Southern Peninsula Golf Course site and bounded on the northeast by Canada Road and I-280, to the southeast by the Woodside town limits, to the southwest by the ridge above West Union Creek, and to the northwest by the access road to the Atherton Phleger estate.

Policy WA37 Prohibit new golf course development on alternative sites on the Peninsula Watershed. Expansion of the Southern Peninsula Watershed Golf Course site at a later date will not be permitted.

Policy WA38 Construction, operation, and maintenance of the Southern Peninsula Watershed Golf Course shall not degrade or cause adverse impacts to source water quality.

Policy WA39 Construction, operation, and maintenance of the golf course must be integrated with the policies and management actions set forth in the Peninsula Watershed Management Plan.

Policy WA40 SFPUC staff shall oversee the ongoing construction, operations, maintenance and monitoring of the golf course in accordance with the policies and management actions set forth in the Peninsula Watershed Management Plan.

Policy WA41 Construction, operations and maintenance of the golf course shall meet or exceed the "Environmental Design Guidelines and Standard Development Requirements for Golf Courses" (Santa Clara County Planning Office, 1996) and "Environmental Principles for Golf Courses in the United States" (Center for Resource Management, 1997) (both are included in Appendix A-2).

Policy WA42 Require waste systems, both solid and liquid, to be designed with two back-up systems such that any spill can be completely contained quickly and efficiently.

Policy WA43 Require that any permanent water impoundment (e.g., pond or lake) be completely lined to prevent pesticide and fertilizer laden seepage into the groundwater if investigation indicates the presence of groundwater and connection to surface waters.

Policy WA44 Require containment of precipitation or runoff entering the golf course and irrigation water from the golf course such that this water is treated to meet parameters acceptable to the Water Quality Bureau prior to entering reservoirs or natural waterbodies.

Policy WA45 Provide adequate sanitation facilities, as approved by the SFPUC, dispersed throughout the golf course to provide adequate water quality protection.

Policy WA46 Require preparation and implementation of an IPM Plan for the golf course pursuant to the City and County of San Francisco's Pesticide Ordinance.

Policy WA47 Investigate alternative sources of water (e.g. recycled water, groundwater) for irrigation use. Balance water quality concerns with water availability.

Policy WA48 Ascertain the impact of the golf course on water quality through periodic groundwater and surface water monitoring by establishing a baseline water quality prior to golf course construction and conducting periodic water quality monitoring thereafter.

Policy WA49 Modify golf course operations if chemical concentrations in the reservoir, surface waters, or groundwater increase. Cease operations if conditions do not improve. Include these requirements in the golf course lease.

Policy WA50 Maximize the use of onsite runoff prior to using potable water for irrigation.

Policy WA51 In the design of the golf course, assure adequate engineering controls (e.g., capture and treatment of runoff) to prevent water quality degradation and to assure adequate drainage to prevent flooding and ponding.

Policy WA52 Prohibit all disturbance to the Edgewood Triangle—the area bounded by Cañada Road, I-280, and Edgewood Road.

Policy WA53 Require mitigation for all significant impacts to biological resources in the design of the Southern Peninsula Watershed Golf Course.

Policy WA54 Preserve from disturbance a 100-foot buffer around all existing and new wetland and riparian habitats to protect the habitat of the San Francisco garter snake and the California red-legged frog.

Policy WA55 Preserve from disturbance all existing upland and sunning areas,

identified by a certified herpetologist, used by the San Francisco garter snake for overwintering.

Policy WA56 Prohibit the removal of groves of trees and encroachment within 20 feet of the drip line of the trees.

Policy WA57 Prohibit the removal of all mature trees. For the removal of younger trees, require mitigation of one tree per one inch (1") diameter breast height (dbh) of tree removed.

Policy WA58 Determine the effects of the golf course on wildlife by periodically monitoring the tissues of at least two predator species.

Policy WA59 Require the use of plants native to the watershed in the landscaping design.

Policy WA60 Require that the golf course lease include a provision for the SFPUC and the City and County of San Francisco to revoke the lease if the golf course is not operated to the satisfaction of these two entities.

Policy WA61 Ensure that the costs of the golf course (including the cost of water; staff and equipment to oversee ongoing management, maintenance, and monitoring and remediation; if required) are not borne by the water system rate payers but by the golf course lessee.

Policy WA62 Ensure the assignment of adequate staff and equipment to oversee the ongoing management, maintenance, and monitoring of the golf course.

Policy WA63 Appoint a Southern Peninsula Watershed Golf Course Oversight Committee to review and provide comments to the SFPUC on all interim and final plans, and to oversee the ongoing operations and maintenance of the golf course. The eight-person committee shall be led by four SFPUC representatives who will be assisted by one representative from San Mateo County; one representative from the GGNRA; and two representatives nominated by the Audubon Society, Sierra Club, California Native Plant Society, and/or the American Herpitological Society.

Policy WA64 Protect the viewshed both from the watershed and I-280 in the design and construction of the Southern Peninsula Watershed Golf Course.

Policy WA65 Protect cultural resources in keeping with the policies set forth in Section 4.7 of the Peninsula Watershed Management Plan.

Fifield/Cahill Ridge Trail

Resolution No. 97-0177, adopted by the SFPUC on June 10, 1997, modified the Peninsula Watershed Management Plan to include the possibility of the Bay Area Ridge Trail route along Fifield and Cahill Ridges. Four alternative projects (described in Chapter 5) as well as the No Project Alternative have been developed to achieve public access along this route.

The alternative policies set forth below address these four projects. These alternatives will be reviewed at the project-level in the Watershed Management Plan EIR. These alternatives are unique in that they are addressed at the project-level unlike all the other policies and actions in the Plan which are addressed at the program-level.

Upon completion of project-level review of these alternatives in the overall programmatic Watershed Management Plan EIR, one of the four policies (WA66a, b, c, or d) for the Fifield/Cahill Ridge Trail and one of the two policies (WA67a or b) for the alignment south of Highway 92 will be selected by the SFPUC and incorporated into the Final Peninsula Watershed Management Plan. The actions set forth in Section 5.22 will be incorporated into the preferred policy when it is adopted.

Policy WA66a Provide unrestricted access to hikers, bicyclists, and equestrians along the Fifield/Cahill Ridge Service Road. The trail route shall extend from Portola Gate in the north to the north side of the intersection of Highway 92 and Skyline Boulevard in the south.

Policy WA66b Provide unrestricted access to hikers, bicyclists, and equestrians along the Fifield/Cahill Ridge Service Road. The trail shall extend from Portola Gate in the north to Skyline Quarry in the south.

Policy WA66c Provide access to hikers who hold an annual permit along the Fifield/Cahill Ridge Service Road. The trail shall extend from Portola Gate in the north to Skyline Quarry in the south.

Policy WA66d Provide docent-led access to hikers along Fifield/Cahill Ridge Service Road from Sneath Lane to Skyline Quarry. The trail shall extend from Portola Gate in the north to Skyline Quarry in the south.

Policy WA67a Support the development of a trail on SFPUC property between Highway 92 and Kings Mountain which generally follows the alignment of Skyline Boulevard and is managed by the method set forth under either Policy WA66a, b, c, or d (e.g., unrestricted access, access by annual permit, or docent-led access).

Policy WA67b Prohibit the development of a trail on SFPUC property between Highway 92 and Kings Mountain which generally follows the alignment of Skyline Boulevard and is managed by the method set forth under either Policy WA66a, b, c, or d (e.g., unrestricted access, access by annual permit, or docent-led access). 🏛

This page intentionally left blank.

4.11 Administration and Finance (AF)

Secondary Goal: Provide a Fiscal Framework that Balances Financial Resources, Revenue-generating Activities, and Overall Benefits, and an Administrative Framework that Allows Implementation of the Watershed Management Plan

Policies have been developed regarding administration of the watershed and financing of watershed programs and activities. These policies focus on staffing responsibilities and training, funding sources, and allocation relative to watershed activities, as well as cost/benefit analysis.

Administration and finance policies have been organized into the following topic areas:

- Staffing - Responsibility and Training
- Funding Allocation/Sources
- Cost/Benefit Analyses and Considerations
- Coordination

Staffing - Responsibility and Training

Policy AF1 LRMS staff shall be responsible for, and shall have authority over, general administration/management of watershed management policies and associated actions.

Policy AF2 SFPUC staff shall be knowledgeable of the Plan goals and policies and shall be adequately trained to implement, or supervise implementation of, all management actions and guidelines.

Policy AF3 SFPUC and LRMS staff shall stay abreast of and adhere to all applicable new laws, rules, regulations, and listings by USFWS and CDFG, as well as other appropriate agencies.

Policy AF4 Provide appropriate staff levels and associated support structure (e.g., materials, equipment) to facilitate the implementation of, and compliance with, all Plan goals, policies, and management actions.

Policy AF5 Provide SFPUC employees with relevant information regarding water quality; water conservation; natural and cultural resource protection; and SFPUC policies, initiatives, and priorities.

Funding Allocation/Sources

Policy AF6 Funding for watershed activities, equipment, training, etc. shall be allocated at levels that are appropriate to meet all applicable Plan goals, policies, and management actions.

Secondary Goal: "Provide a Fiscal Framework that Balances Financial Resources"

Policy AF7 Funding for the administration and management of watershed activities (i.e., leases, permits, and public use) that are not related to water quality, water supply, and responsible watershed management and protection shall be borne by the parties benefiting from the uses specific to those activities.

Policy AF8 Finance the purchase of watershed lands and/or easements outside of SFPUC ownership that are critical to watershed water quality and supply, or may be used for mitigation banking in connection with habitat conservation or project related mitigation activities.

Cost/Benefit Analyses and Considerations

Policy AF9 Require that the costs of the permit process be borne by the applicant either directly through recreation permit fees or indirectly through increased lease fees.

Policy AF10 Require that direct and indirect benefits associated with watershed leases, permits, and public access activities meet or exceed direct and indirect costs.

Policy AF11 Prior to making changes to existing or implementing new operations and maintenance activities, SFPUC staff or contractor shall determine the relative costs and benefits (in terms of erosion and sedimentation) for alternative locations or types and intensities of the proposed land use or activity; possible future corrective actions (slope repairs and maintenance); and/or increased maintenance costs for downslope sediment capture and removal.

Coordination

Policy AF12 Coordinate with and integrate data between the LRMS GIS and the GIS and other data systems of other SFPUC organizational units.

4.12 Public Awareness and Agency Participation (PA)

Secondary Goal: Enhance Public Awareness of Water Quality, Water Supply, Conservation, and Watershed Protection Issues

The watershed offers incomparable opportunities to educate and inform students of all ages about water quality, water supply, water conservation, natural resources, and watershed protection issues. The watershed provides an opportunity for future generations to appreciate these varied resources and better understand their responsibility for maintaining this valued heritage for future generations.

As part of enhancing public awareness, it is important to provide opportunities to educate decision-makers and to make the public aware of the numerous SFPUC careers related to water quality protection and watershed management.

Policies have been developed to enhance public awareness of water quality, water supply, conservation, and watershed protection issues. The policies focus on educating the general public and upstream landowners, as well as interjurisdictional coordination with other agencies and organizations.

Public awareness policies have been organized into the following topic areas:

- Public Education
- Coordination
- Research and Monitoring

Public Education

Policy PA1 Educate the public on the importance of protecting their water supplies and on measures to minimize risk.

Policy PA2 Foster and support public information and educational programs that emphasize individual and community responsibility for resource protection and conservation, and foster an appreciation for the history, cultural resources, biology, ecology, and water supply system of the watershed.

Policy PA3 Foster individual public awareness programs for: (a) visitors to the watershed; (b) lessees, landowners, and others within the hydrologic region that may have direct impacts upon the watershed; (c) outreach education efforts (e.g., schools, conferences, seminars); and (d) the general public.

Policy PA4 Encourage and support, in coordination and cooperation with local school districts and colleges, educational use of the watershed and the watershed GIS data for ecological sciences curriculum.

Policy PA5 Provide educational opportunities for underprivileged groups,

Secondary Goal: "Enhance Public Awareness of Watershed Protection"

school children, and families to visit and learn about the watershed.

Coordination

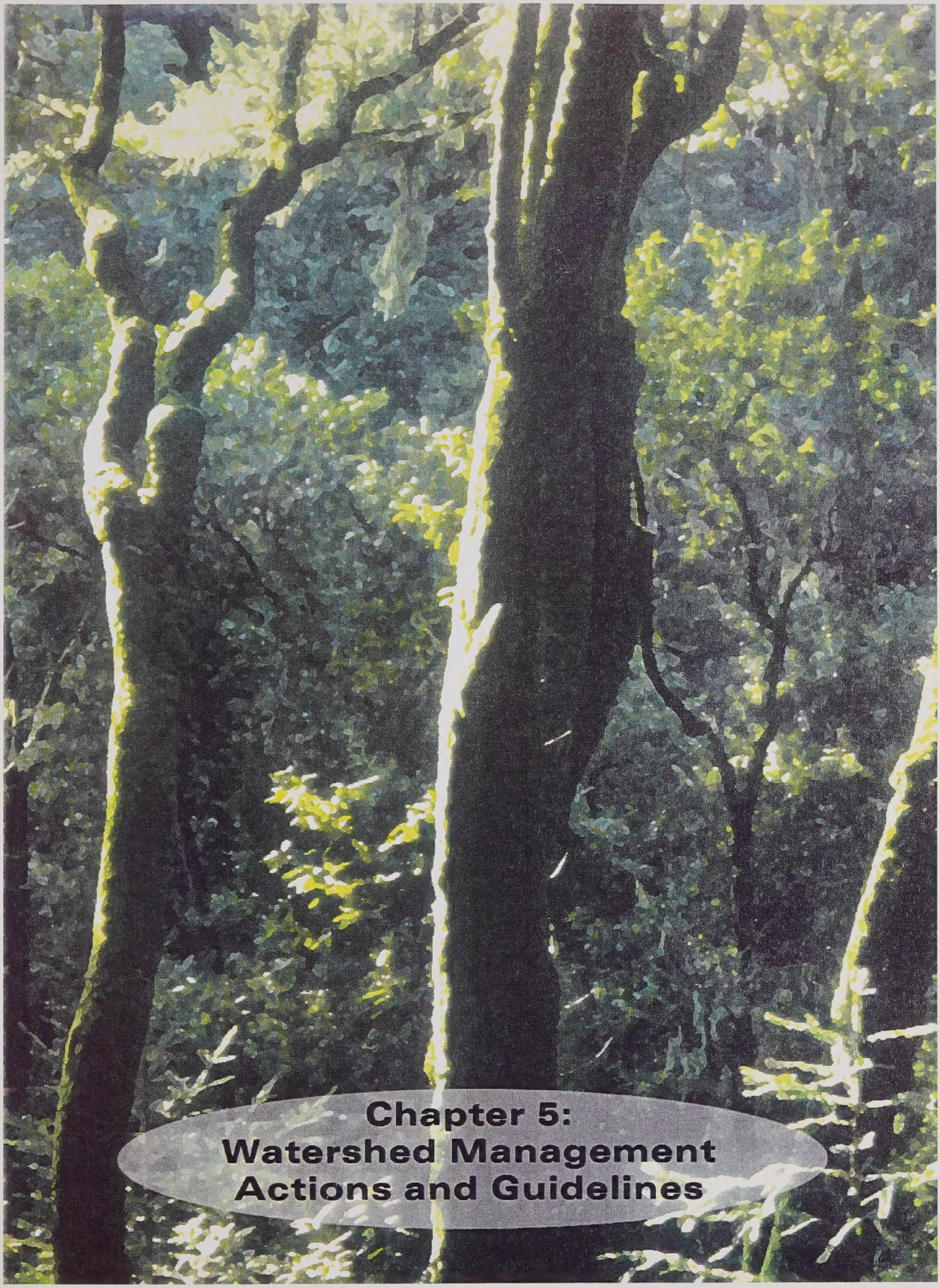
Policy PA6 Encourage agencies with jurisdiction over watershed lands outside of SFPUC control to adopt similar regulations, management practices, and ordinances to protect water quality and watershed lands.

Research and Monitoring

Policy PA7 Encourage and allow investigations of natural resources on the watershed for scientific research and education to increase the general understanding of these resources and their condition.

Policy PA8 Conduct research and monitoring activities through collaborative and cooperative efforts with other agencies/groups whenever possible.

Policy PA9 Restrict dissemination of maps identifying sensitive resources (e.g., ecological and cultural resources) to appropriate watershed personnel and qualified professionals only, to avoid possible resource disturbance through inadvertent disclosure of site information to unauthorized personnel.



Chapter 5: Watershed Management Actions and Guidelines

Chapter 5 Watershed Management Actions and Guidelines

5.1 Introduction

The previous chapter presented the goals and policies to be used by the SFPUC to make decisions regarding watershed management. This chapter presents the management actions and guidelines that implement the goals and policies. The management actions are specific tasks and are intended to guide SFPUC staff and LRMS staff in the day-to-day activities required to properly manage the watershed. Guidelines provide additional direction and clarification for selected management actions. Management actions are intended to be implemented over the next 25 years and are included here because they are the most appropriate actions for management of the watershed at the present time. Inclusion of these actions does not ensure that funding, staff, or equipment will be available to implement these actions, nor does it obligate the SFPUC to implement actions it chooses not to.

"Management actions are specific tasks, intended to guide staff in the day-to-day activities required to properly manage the watershed"

Rather than being organized by goals as previous chapter was, this chapter is organized by management topic to facilitate ease of use by SFPUC and LRMS staff. The management topics are the functional areas (e.g., roads, stormwater, vegetation) which are already managed by SFPUC and LRMS staff.

Table 5-1 indicates the goals and policies from which the management actions are derived. As mentioned above, the management actions implement the goals and policies. In the table, a circle designates that the action directly implements a specific goal and its policies. A diamond indicates that the action has an indirect role in implementing a specific goal and its policies. For example, the management actions set forth under Waste - Human and Animal directly implement the water quality goal and policies. These actions are designed to prevent human and animal waste from entering the reservoirs and contaminating the water supply. Alternatively, the actions for Aquatic Zone Protection indirectly implement the water quality goal and policies, but these actions also directly protect fishery resources and wildlife. In keeping with the primary goal of water quality protection, most of the management actions either directly or indirectly implement the water quality goal and policies.

Table 5-2 includes a list of the 22 management action topics and sub-topics, as well as their applicable section number, acronym, and location within the chapter. The sub-topics provide further clarity and readability. Many of the management actions also refer the reader to other relevant topics and/or actions. Although certain management actions may be applicable to several topics, ac-

tions are listed only once in this chapter, under the topic which is most relevant.

Each action includes, in boldface type, a set of key words summarizing the management action. These key words are carried forward into Chapter 6: Phasing and Implementation, where each action is assigned a phasing priority. Coordination responsibilities and related actions are also identified in Chapter 6.

Codes are included in Chapter 5 to identify the phase in which each action is proposed to occur. These codes are:

- Phase 1: within 5 years of Plan adoption;
- Phase 2: within 10 years of Plan adoption;
- Phase 3: within 20 years of Plan adoption; and/or
- (A): on an as-needed basis
- (B) at regular intervals throughout the life of the Plan.

Coding of actions can be either a phase number, a combination of phase number and an (A) or (B), or an (A) or (B) alone. For example an action can be identified as Phase 1 indicating it should commence within the 5 years of Phase 1 adoption. An action can also be identified as Phase 1A indicating that it should commence in Phase 1 and recur on an as-needed basis. An action can also be identified as Phase A indicating that the time of commencement of the action is uncertain but the action should occur on an as-needed basis. Phase A actions are generally related to proposals for new projects on the watershed. There are no actions which are Phase B alone.

For a more detailed discussion of phasing please refer to Chapter 6.

WATERSHED MANAGEMENT ACTIONS AND GUIDELINES	WATERSHED MANAGEMENT GOALS AND POLICIES					
	Water Quality	Water Supply	Ecological and Cultural Resources			
			Vegetation	Wildlife	Aquatic Resources	Cultural Resources
Stormwater (sto)	●	◆			◆	
Hazardous Materials & Contaminants (haz)	●	◆			◆	
Waste - Human & Animal (was)	●	◆			◆	
Roads (roa)	●	◆			◆	
Conservation & Reclamation of Water (con)		●				
Fire Management (fir)	●	◆	◆			
Safety and Security (saf)	◆					
Vegetation & Soil Management (veg)	●	◆	●			
Wildlife (wil)				●		
Aquatic Zone Protection (aqu)	●	◆				
Fisheries (fis)					●	
Cultural Resources (cul)						●
Environmental Compliance (env)	◆		◆	◆	◆	◆
Lease & Permit Requirements (lea)	●	◆				◆
Public & Agency Outreach (pub)	◆	◆	◆	◆	◆	◆
Staffing & Training (sta)	●	◆	●	●	●	●
Fiscal Framework (fic)	◆	◆	◆	◆	◆	◆
Information Management (inf)	◆	◆	◆	◆	◆	◆
Design & Construction Requirements (des)	●	◆	◆	◆	◆	◆
Southern Peninsula Watershed Golf Course (gol)	◆	●				◆
Fifield/Cahill Ridge Trail (tra)	●	◆	◆	◆	◆	

WATERSHED MANAGEMENT ACTIONS AND GUIDELINES	WATERSHED MANAGEMENT GOALS AND POLICIES				
	Fire and Safety		Watershed Activities	Administration and Finance	Public Awareness
	Fire	Safety & Security			
Stormwater (sto)				◆	◆
Hazardous Materials & Contaminants (haz)				◆	◆
Waste - Human & Animal (was)				◆	◆
Roads (roa)	◆			◆	
Conservation & Reclamation of Water (con)				◆	◆
Fire Management (fir)	●	◆		◆	◆
Safety and Security (saf)	◆	●		◆	◆
Vegetation & Soil Management (veg)	◆			◆	◆
Wildlife (wil)					
Aquatic Zone Protection (aqu)				◆	
Fisheries (fis)					◆
Cultural Resources (cul)					◆
Environmental Compliance (env)		◆		◆	
Lease & Permit Requirements (lea)				◆	◆
Public & Agency Outreach (pub)	◆	◆	●	◆	●
Staffing & Training (sta)	●	●	◆	◆	◆
Fiscal Framework (fic)				●	
Information Management (inf)	◆	◆			◆
Design & Construction Requirements (des)		◆		◆	
Southern Peninsula Watershed Golf Course (gol)			◆	◆	◆
Fifield/Cahill Ridge Trail (tra)	◆		◆	◆	◆

● Directly Achieves Goal

◆ Indirectly Achieves Goal

Table 5-1 Derivation of Watershed Management Actions from Goals and Policies

Section	Management Topic	Acronym	Page Number
5.2	Stormwater	sto	5.2-1
5.3	Hazardous Materials and Contaminants • SFPUC Facilities and Procedures • Spill Response • Coordination and Collaboration	haz	5.3-1
5.4	Waste - Human and Animal • SFPUC Facilities • Lessees and Non-SFPUC Facilities • Additional Surveys and Monitoring • Coordination and Collaboration	was	5.4-1
5.5	Roads • Assessment and Management of Existing Roads • New Roads	roa	5.5-1
5.6	Conservation and Reclamation of Water	con	5.6-1
5.7	Fire Management • Fire Pre-Suppression • Fire Defense Improvement • Fuel Management • Fire Response • Fire Management Plan Implementation • Monitoring	fir	5.7-1
5.8	Safety and Security • Law Enforcement • Safety and Security Program • Watershed Reservoir Patrol • Watershed Manual • Coordination and Collaboration	saf	5.8-1
5.9	Vegetation, Soil and Pest Management • Vegetation Management Plan • Assessment Prior to New Activities • Restoration • Exotic Species • Forest Management • Soils Management • Integrated Pest Management • Coordination and Collaboration	veg	5.9-1
5.10	Wildlife • Assessment Prior to New Activities • Wildlife Movement • Wildlife Habitat • Sensitive, Rare, Threatened and Endangered Species • Future Studies and Monitoring • Coordination and Collaboration	wil	5.10-1
5.11	Aquatic Zone Protection • Assessment Prior to New Activities • Reservoirs and Reservoir Shorelines • Stream Channels and Banks • Wetlands • Sedimentation Basin Management • Monitoring	aqu	5.11-1
5.12	Fishery Resources • Fish Migration • Habitat Management	fis	5.12-1

Table 5-2 Management Action Topics, Acronyms, and Page References

Section	Management Topic	Acronym	Page Number
5.13	Cultural Resources • Assessment Prior to New Activities • Protection of Existing Resources • Monitoring	cul	5.13-1
5.14	Environmental Compliance • Environmental Compliance Responsibilities • Assessment Prior to New Activities/Leases • EIR Mitigation Measures • Coordination and Collaboration	env	5.14-1
5.15	Lease and Permit Requirements • Public Access Permits • Land Use Lease and Permit Requirements	lea	5.15-1
5.16	Public and Agency Outreach • Public Education Program • Facilities and Information • Docent Program • Coordination and Collaboration	pub	5.16-1
5.17	Staffing and Training • Staffing • Enforcement Procedures Training • Watershed Resource and Watershed Management Plan Training • Fire Management and Emergency Response Training	sta	5.17-1
5.18	Fiscal Framework • Costs and Benefits of Watershed Activities • Lease and Permit Fees • Watershed Management Funding • Funding Sources • Acquisition of Watershed Lands • Fines	fic	5.18-1
5.19	Information Management • Watershed Natural Resources Center • GIS Operations and Database Maintenance • Watershed Web Page Maintenance • Coordination and Collaboration	inf	5.19-1
5.20	Design and Construction Requirements • Review Process for Proposed Plans and Projects • Construction Fencing • Design Guidelines • Accessibility Compliance	des	5.20-1
5.21	Southern Peninsula Golf Course • Water Quality Protection • Pest Management • Southern Peninsula Golf Course Oversight Committee • Natural Resource Studies and Monitoring	gol	5.21-1
5.22	Fifield/Cahill Ridge Trail • Alternative A - Unrestricted Access with Termination at Highway 92/Skyline Boulevard • Alternative B - Unrestricted Access with Termination at Skyline Quarry • Alternative C - Access by Annual Permit • Alternative D - Docent-Led Access • Alternative A/B - Programmatic Skyline Boulevard Alignment from Highway 92/Skyline Boulevard	tra	5.22-1

This page intentionally left blank.

5.2 Stormwater (sto)

Stormwater runoff is the overland flow of precipitation. Stormwater from the local watersheds contributes approximately 5 to 10 percent of the water system's total supply. As such, the quality and maintenance of this important resource is integral to maintaining high quality water. Impervious or highly compacted surfaces (such as roads and parking lots) represent the areas of greatest concern with regard to stormwater. Approximately 100 miles of paved roads and 39 miles of unpaved roads (including I-280, Highway 92, Skyline Boulevard, Canada Road, and Edgewood Road) and trails are located on the Peninsula Watershed. These dense surfaces accelerate the rate of flow and subsequently increase the potential for downstream erosion, which affects water quality and water supply (by reducing reservoir storage capacity). In addition, roads and parking lots are a source of contaminants (e.g., motor oil, etc.); flows over these areas likewise affect water quality.

The actions presented in this section are focused on proactively managing existing stormwater drainage facilities and incorporating the use of alternative technologies wherever feasible, with an emphasis on water quality. Additional actions related to stormwater management but more appropriately addressed in other sections include:

- actions relating to road management (Section 5.5: Roads)
- actions relating to soils management (Section 5.9: Vegetation, Soil, and Pest Management).

For additional detail on recommended BMPs, refer to Appendix C-6.

Action sto1 (Phase 2A) Assess the **on-site stormwater** collection and drainage **systems** at SFPUC facilities, Pulgas Water Temple, Peninsula Recreational Corridor parking lots, Crystal Springs Golf Course, and the Skyline Quarry for adequate sizing and erosion. Remediate where necessary by establishing preventive maintenance programs, infiltration drainfields and trenches, or wet and dry detention basins to optimize the quality of stormwater that flows into reservoirs and tributaries. Guidelines include:

A. Determine appropriate storm drain outlet locations to develop water quality detention basins which capture stormwater and filter out undesirable water quality constituents. This can be accomplished through vegetated filter strips/swales, porous soils, first-flush diversions, wetlands, and other BMPs identified in Appendix C-6 for stormwater quality control.

B. Direct pollutant loadings away from bridge decks by diverting runoff to land for treatment. Effort and sizing should be focused on first-flush events (capturing the highest concentration of contaminants during the first significant rainfall of the season).

C. Assess structural features allowing isolation of hazardous materials spills prior to reaching reservoirs or tributaries.

D. Develop a monitoring program for stormwater runoff areas of concern to es-

tablish baseline conditions (e.g., roads with heavy vehicle usage proximate to waterbodies). Continue monitoring after implementation of BMPs to measure any improvements. Conduct regular inspection of storm drainage facilities to ensure proper operation.

E. Maintain up-to-date plans of roadway storm drainage systems and include stormwater contamination assessment and spill prevention plan.

Action sto2 (Phase 1B) Field verify on a biannual basis that stormwater **runoff from I-280** is exported out of the watershed.

Action sto3 (Phase 1) As part of the **Highway 92** widening project, ensure that a **stormwater collection** and filtration system is included and meets appropriate water quality requirements.

Action sto4 (Phase A) Upon completion of the **Highway 92** widening project, periodically field verify that **stormwater runoff** is adequately collected and filtered.

5.3 Hazardous Materials and Contaminants (haz)

The use, storage, and/or occurrence of hazardous substances in the watershed are associated with three basic activities: standard SFPUC maintenance practices (e.g., application of herbicides for vegetation management, use of petroleum products for SFPUC vehicle/equipment operations and maintenance, etc.); public uses such as major roadways; and existing areas containing potential contaminants (Skyline Quarry). Proper management of hazardous substances is essential to the preservation and maintenance of water quality.

The management actions for hazardous materials and contaminants provided in this section are divided into the following topics:

- SFPUC Facilities and Procedures
- Spill Containment and Response
- Coordination and Collaboration

Additional actions related to hazardous materials and contaminants but more appropriately addressed in other sections include:

- backwash disposal procedures (Section 5.4: Waste - Human and Animal);
- runoff of vehicle-related contaminants (Section 5.5: Roads);
- the application of fire suppression chemicals (Section 5.7: Fire Management);
- development of emergency response plans and procedures (Section 5.8: Safety and Security); and
- requirements for lessees dealing with hazardous materials (Section 5.15: Lease and Permit Requirements).

SFPUC Facilities and Procedures

Action haz1 (Phase 1) Develop **hazardous chemical management procedures** addressing the type, use, storage, transport, and disposal of hazardous chemicals and pesticides used in watershed activities (e.g., SFPUC operations, pest management, easements and leases, etc.). Guidelines include:

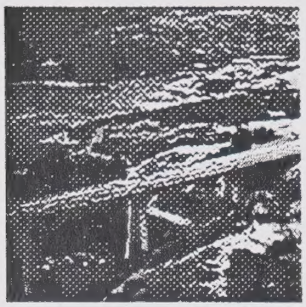
A. Ensure proper material transport procedures (e.g., tie-down/attach material to vehicle).

B. Carry appropriate spill response chemicals when transporting hazardous chemicals and pesticides.

Action haz2 (Phase 2B) Inventory and annually monitor all above- and below-ground **fuel storage tanks**, refueling stations, and vehicle maintenance yards within the watershed (e.g., Skyline Quarry, Crystal Springs Golf Course, Filoli Estate) for control of vehicle-related contaminants and for compliance with applicable hazardous materials storage and handling requirements, as well as underground storage tank requirements.

Action haz3 (Phase 2) Identify and prioritize for removal from SFPUC lands, **dump sites** that pose a hazard to water

"Hazardous substances in the watershed are associated with SFPUC maintenance practices, public uses such as major roadways, and existing areas containing potential contaminants."



I-280 Overpass

quality and/or watershed resources. The program shall include:

A. A thorough inventory of all existing dump sites and elements found within them.
B. A plan to safely remove and dispose of the contents of each of the dumps.
C. Strategies developed in conjunction with appropriate local agency(ies) to discourage future dumping on SFPUC lands, including signage, patrols, public notices, and fines.

Action haz4 (Phase 1) Identify key locations for, and install, **barriers or fencing** to prevent access to reservoir edges and dams to prevent illegal dumping.

Action haz5 (Phase 1) Conduct regular servicing for the SFPUC vehicle fleet and equipment so that leaks/drips/spills of **contaminants** are minimized. Guidelines include:

A. Immediately report accidental spills of hazardous materials into surface waters to the Water Quality Bureau and the appropriate State agencies.
B. Require that buckets and absorbent materials be carried in all SFPUC vehicles in case of an accident or breakdown in which vehicle-related fluids are released.
C. Follow appropriate BMPs in Appendix C-6 to minimize leaching of vehicle-related contaminants into the soil or groundwater from facilities.
D. For fire protection purposes, ensure that all vehicles and equipment are equipped with spark arrestors and each vehicle carries fire suppression equipment.

Action haz6 (Phase 1) Review and standardize SFPUC **boating practices**. Guidelines include:

A. Standardize servicing, including inspection and maintenance schedules.
B. Prohibit boat maintenance (e.g., refinishing or cleaning of hulls) within the watershed.
C. Standardize refueling procedures to minimize the possibility of spills.
D. Develop containment methods should a spill occur.
E. Install air/fuel separators on air vents or tank stems of inboard fuel tanks on all boats to reduce amount of fuel spilled during refueling.
F. Convert existing boat engines to cleaner-burning four-stroke or fuel-injected engines.

Action haz7 (Phase 1) Develop and implement a clean-up and enhancement plan for **Skyline Quarry**. The plan should address:

A. Site clean-up,
B. Wetland relocation and/or protection,
C. Slope stabilization, and
D. Future management and monitoring.

Spill Containment and Response

Action haz8 (Phase 1) Identify **high-risk spill potential areas** and implement measures (e.g., fines, barricades, etc.) to reduce the risk of hazardous spills.

Action haz9 (Phase 1) Install barriers on Upper Crystal Springs Dam to prevent vehicles carrying hazardous ma-

terials from landing in the reservoir during an accident.

Action haz10 (Phase 1) Develop **spill response and containment measures** for SFPUC vehicles on the watershed. These measures should be coordinated with the overall Emergency Response Plan developed in Action saf7.

Action haz11 (Phase 1) Train staff members, as appropriate, in **spill response and containment** measures for SFPUC vehicles on the watershed.

Action haz12 (Phase 1) Maintain a network of **hazardous materials clean-up storage lockers** at accessible locations on each reservoir and at areas where spill potential is high.

Coordination and Collaboration

Action haz13 (Phase A) Require CalTrans to include **spill containment and diversion facilities** in new and upgraded facilities along I-280 and Highway 92. Review adequacy of facilities per SFPUC's needs and policies.

Action haz14 (Phase 1B) Practice **interagency spill response** to isolate contaminants released in various reaches of the roadway. Assess adequacy and where needed, improve elapsed time between spill event, and notification of SFPUC staff.

Action haz15 (Phase 1B) Maintain routine contact with the Federal Aviation Administration (FAA) to ensure that notification is made when an aircraft originating from air traffic at San Francisco Airport ejects fuels on or near watershed lands. Establish a program that would monitor air samples. Activate monitoring program once notified by FAA of **jet fuel releases**.

This page intentionally left blank.

5.4 Waste - Human and Animal (was)

The presence and disposal of human and animal waste products within the watershed has a direct effect on water quality. The parasite *Cryptosporidium* is of the greatest concern on the Peninsula Watershed; however, *giardia lamblia* and other pathogens also pose significant health risks.

"The parasite Cryptosporidium is of the greatest concern on the Peninsula Watershed."

The management actions for human and animal waste provided in this section are divided into the following topics:

- SFPUC Facilities and Procedures
- Lessees and Non-SFPUC Facilities
- Additional Surveys and Monitoring
- Coordination and Collaboration

Additional actions related to human and animal waste but more appropriately addressed in other sections include:

- minimizing and containing stormwater runoff, which is one of the primary methods for dispersion of waste products into the water system (Section 5.2: Stormwater); and
- requirements for adequate sanitary facilities in new development (Section 5.21: Design and Construction Requirements).

SFPUC Facilities and Procedures

Action was1 (Phase 2) Inspect all SFPUC facilities to assess conditions of **vault, chemical, and composting toilets** and repair/replace as necessary. To minimize risk of contaminating water supplies, follow the guidelines below:

A. Establish a frequent and regular service and inspection schedule.

B. Require secondary containment for vaults or leak detection alarm (for example, bolt chemical toilets to foundation and install berm to catch spills).

C. Verify that there are adequate numbers of chemical or composting toilets.

Lessees and Non-SFPUC Facilities

Action was2 (Phase 2) Inspect sanitation and waste treatment systems at **Crystal Springs Golf Course, Filoli Estate, CalTrans Rest Stop and Yard, and San Mateo County Parks** to assess condition, performance, and impacts on surface and groundwater quality. Implement the following guidelines:

A. Stipulate maintenance/repair/replacement schedule in lease provisions.

B. Reduce risk associated with chemical toilets by requiring bolting to foundation and installation of berm or other secondary containment. Vaults should include secondary containment/alarm system. Implement BMPs if needed.

C. Conduct ongoing monitoring to detect surface water degradation. Include groundwater monitoring under

the following conditions: if adequate wells are available to reduce sampling costs, if there is evidence of surface water contamination, or in the event that other concerns appear.

Additional Surveys and Monitoring

Action was3 (Phase 3) Conduct monitoring in areas where wildlife concentrate (e.g., bats, birds, etc.) to assess the contribution of **wildlife excrement** to water quality degradation. If necessary, develop a management strategy to minimize this situation consistent with protection of the water quality.

Coordination and Collaboration

Action was4 (Phase A) Consult with San Mateo County regarding **new residential development** within the hydrologic watershed to provide appropriate guidance related to on-site waste disposal systems and encourage the following:

A. Export waste outside the watershed.
B. Routine systems inspection and performance testing.
C. Construction of upgrades such as leak alarms and secondary containment berms, if necessary.
D. Use of BMPs, including a schedule of system care and pumping frequency, inspection schedule and procedures, and disposal options.
E. Conduct ongoing monitoring to detect impacts on reservoir.

Action was5 (Phase 1) Coordinate with the GGNRA to **install restrooms on Army Road.** 🏛

5.5 Roads (roa)

Paved and unpaved roads on the watershed are natural receptacles of by-products such as motor oil, gasoline, refuse, and residue from exhaust emissions. The dense nature of the roadway surfaces (whether paved or not) accelerates the rate of stormwater flow, which increases the potential for erosion and transports these by-products of motor vehicle operation into the water supply, thereby jeopardizing water quality. In addition, the major thoroughfares (such as I-280, Highway 92, and Skyline Boulevard) typically function as transportation corridors for trucks carrying hazardous cargo. The transfer of hazardous cargo through the watershed introduces the risk of spill, which further increases the threat to water quality.

The management actions for roads provided in this section are divided in the following topics:

- Assessment and Management of Existing Roads
- New Roads

Additional actions related to roads but more appropriately addressed in other sections include:

- stormwater runoff control measures (Section 5.2: Stormwater);
- erosion control measures (Section 5.9: Vegetation, Soil, and Pest Management);
- emergency response procedures for hazardous roadway spills (Section 5.3: Hazardous Materials and Contaminants and Section 5.8: Safety and Security); and
- fire defense improvement requirements (Section 5.7: Fire Management).

For additional detail on relevant BMPs, refer to Appendix C-6.

Watershed Internal Road

Assessment and Management of Existing Roads

Action roa1 (Phase 1) Evaluate, rank the importance of, and implement **modifications to the existing road system** to reduce erosion and sedimentation, and achieve the "least" road (modify length and width) to meet projected needs. Guidelines for the evaluation include:

A. Evaluate the need for the road.
B. Identify present and future level and type of use.
C. Inventory physical characteristics.
D. Evaluate historical performance.
E. Determine ownership/responsibility.
F. Follow BMPs for evaluation guidelines.

Action roa2 (Phase 1) Relocate existing necessary **high use roads**/road segments in proximity to streams (i.e., within 150 feet) if these roads are determined to be the primary source of excessive erosion and sedimentation, wherever possible.

"Roads are natural receptacles of by-products such as motor oil, gasoline, refuse, and residue from exhaust emissions. Roadway surfaces accelerate the rate of stormwater flow, which increases the potential for erosion."

Action roa3 (Phase 1) Modify the grading and drainage of existing necessary **high use roads**/road segments to reduce the potential for excessive erosion and sedimentation. Guidelines for these modifications include:

A. Convert non-sloped roads to sloped roads.
B. Reduce the use of inside ditch lines and culverts by installing rolling dips at intervals dictated by terrain and road angle.
C. Improve the performance of remaining ditches and culverts by adding flared inlets and permanent erosion protection at the culvert outfalls. Prohibit improper culvert installation practices such as shotgun culvert outfalls, culverts without energy dissipaters, improperly sized culverts, etc.
D. Ensure that stream crossings have the hydraulic capacity to safely handle the expected storm frequency for lifespan of crossing.
E. Modify or replace culverts with inadequate capacity or alignment.
F. Establish artificial toe mass for slumps and slides.

Action roa4 (Phase 2) Close and retire (regrade, revegetate, restore) roads that are not needed for safety or access and eliminate or minimize problem erosion points by installing culverts and waterbars, or otherwise stabilizing the roadway.

Action roa5 (Phase 2) Reduce the need for multiple maintenance access **roads** on infrastructure easements by consolidation.

Action roa6 (Phase 2A) Inspect and manage unpaved roads, appurtenant stormwater collection systems, unlined stormwater conveyance systems, and other stormwater facilities according to applicable sections of the California Forest Practices Act Rules (also see Action sto1). Guidelines include:

A. Remediate and stabilize areas experiencing significant erosion (e.g., road cuts and stream crossings).
B. Regrade unpaved roads to minimize erosion.

Action roa7 (Phase 1B) Maintain fire roads to minimize sediment generation through effective installation of waterbars, avoidance of unnecessary grading, and paving short lengths of road where needed.

Action roa8 (Phase 2) Restrict access on low use roads with sensitive soil types and emergent water features (e.g., emergency access only) by gates or barriers, allow revegetation by scarifying the road surface and planting grass seed, and use mowing as the road maintenance, or at a minimum provide water bars or broad dips.

Action roa9 (Phase 2B) Periodically inspect closed roads to ensure vegetation stabilization and drainage measures are operating as planned, and conduct reseeding and drainage maintenance as needed.

Action roa10 (Phase 2B) Conduct **annual inspections and repairs**, as necessary, to reshape roads to conserve existing material, retain the design cross section, and prevent or remove irregularities that retard normal surface runoff; clear road inlets and outlet ditches, catch basins, culverts, and other stream-crossing structures of obstructions prior to the onset of the wet season.

Action roa11 (Phase A) Monitor road conditions during **heavy use periods** and/or unfavorable weather conditions; limit use on the basis of road condition when necessary to prevent excessive erosion or sedimentation, and close roads seasonally if conditions warrant.

New Roads

Action roa12 (Phase A) Design, site, and construct **new roads** following specific guidelines and BMPs for road location and alignment (slope position, distance from stream, stream crossings); design (gradient, width, drainage, etc.); and construction procedures appropriate for wildland conditions. Specific practices should be drawn from the California Forest Practices Act; guidelines include:

A. Avoid streams, riparian areas, and unstable slopes.
B. Minimize the number of stream crossings.
C. Locate required crossings at a right angle to streams.
D. Select appropriate crossing types.
E. Provide drainage that removes water before it becomes concentrated.
F. Minimize grading.
G. Bridges and culverts should be adequately sized and properly aligned; fords should only be used where the bed has a firm rock or gravel bottom, where approaches are low and stable, and where fish or other sensitive aquatic resources are not present during low flows.
H. Locate and design new roads and trails to follow natural topography, minimize steep slopes and stream crossings, avoid large cut and fill road designs, minimize excavation, and avoid highly erodible areas.

This page intentionally left blank.

5.6 Conservation and Reclamation of Water (con)

Employing water conservation practices and using raw or reclaimed water for on-site needs increase the quantity of water available for SFPUC customers. This section addresses the most plausible opportunities to implement these practices, including the use of raw or reclaimed water for irrigation and fire suppression activities and enhancing aquifer recharge zones.

Actions related to water conservation and reclamation but more appropriately addressed in other sections include:

- actions requiring new lessees and permittees to conserve water (Section 5.15: Lease and Permit Requirements).

Action con1 (Phase 1B) Periodically evaluate **landscaping and irrigation practices** for water efficiency and where necessary implement water conservation techniques. Guidelines include:

A. Revegetate using native and/or drought-tolerant species.

B. Customize irrigation techniques per plant species.

Action con2 (Phase 1) Evaluate the feasibility of, and implement where possible, the **use of raw untreated water or reclaimed water** for uses such as roadways, Filoli Estate, Crystal Springs Golf Course, irrigation of the Peninsula Recreational Corridor, SFPUC facilities and grounds, sanitation facilities, fire suppression, other landscape irrigation needs, and during construction or earthmoving activities within the watershed.

Action con3 (Phase 1) Identify appropriate locations for **additional native trees and shrubs** to increase the supply of water from fog-drip ecosystems and overall water yield.

Action con4 (Phase 1B) Reduce large volumes of **brush** balanced with habitat concerns, and vegetation and fire management requirements to increase water yields through reduction in transpiration losses. Use prescribed burns in areas subject to brushy encroachment by Northern coastal scrub to stabilize grassland/shrub boundaries.

Crystal Springs Golf Course

"Employing water conservation practices and using raw or reclaimed water for on-site needs increase the quantity of water available for SFPUC customers."

This page intentionally left blank.

5.7 Fire Management (fir)

Fire events on the watershed pose a direct threat to water quality and quantity due to the resultant increase in erosion, introduction of chemicals used to suppress the fire, and increase in sedimentation. Fire events also pose hazards to persons and property. The watershed has not experienced a significant fire event for more than 100 years; as a result there are concerns about the amount and extent of natural fuel available should a fire occur today. In 1977, the CDF designated the watershed as a hazardous fire area. To address the important issue of fire management, the Peninsula Fire Management Element was prepared and is provided in Appendix A-1. The Element evaluated fire hazard on the Peninsula Watershed using the following three methods: (1) the hazard (or more specifically, the severity) was mapped in accordance with rules defined under the California Wildfire Severity Law AB 337; (2) static fire behavior predictions were run using BEHAVE - a computerized fuel and fire behavior prediction model developed by the U.S. Forest Service (USFS); and (3) fire spread and growth potential were evaluated using FARSITE - a computer program developed by the NPS and used by both the USFS and the NPS. The Element presents an integrated approach to fire management which considers impacts to water quality, water supply, and ecological resources.

The Fire Element presents an integrated approach to fire management that considers impacts to water quality, water supply, and ecological resources and protection of persons and property. It designates specific areas in need of fire management, identifies recommended management techniques for these areas, and provides a day-to-day operations and maintenance plan for fire-related activities. In so doing, the Fire Element is divided into four sub-elements: Fire Defense Improvement, Fuel Management, Fire Response, and Monitoring.

Watershed Grasslands

The actions presented below were derived from the Fire Element, are organized by each of the sub-elements, and focus on the broad actions set forth in the Element. The reader is encouraged to refer to the sub-elements of the Fire Management Element in Appendix A-1 for detailed descriptions of each action, as well as recommended techniques and standards.

The management actions for fire management provided in this section are divided into the following topics:

- Fire Pre-Suppression
- Fire Defense Improvement
- Fuel Management
- Fire Response
- Fire Management Plan Implementation
- Monitoring

Additional actions related to fire management but more appropriately addressed in other sections include:

- actions related to fire road maintenance and new roads (Section 5.5: Roads);
- actions related to emergency response plans and procedures (Section 5.8: Safety and Security);
- actions associated with the Vegetation Management Plan and also with reducing soil erosion (Section 5.9: Vegetation, Soil, and Pest Management);
- appropriate herbicides and use procedures for vegetation management (Section 5.9: Vegetation, Soil, and Pest Management);
- actions related to fire-related training (Section 5.18: Staffing and Training); and
- actions related to fire prevention equipment for SFPUC vehicles (Section 5.3: Hazardous Materials and Contaminants).

Fire Pre-Suppression

Action fir1 (Phase 1A) Prior to authorizing the use of any vehicle or equipment on the watershed, require that SFPUC vehicle/equipment **comply with the fire prevention regulations** established by CDF for use in the watershed. Non-SFPUC equipment must be certified by CDF. All vehicles/equipment shall include:

- spark arrestors;
- carry fire suppression equipment during fire season.

Fire Defense Improvement

Action fir2 (Phase 1) Install a total of seven **dry hydrants** into reservoirs or other water sources to reduce the complexity of long-distance water shuttle operations. The dry hydrants shall be installed at the following locations:

A. South of Section 19 on the east side of Old Canada Road (to be co-located with a hydrant).
B. At the top of the drainage north of the unnamed peak (elevation 1,793 feet above sea level) in Section 31 located at the western boundary of the watershed (to be co-located with a hydrant).
C. At the east end of Pilarcitos Dam.
D. At the intersection of San Mateo Creek and the road to Lower Crystal Springs Reservoir.
E. At the point south of the tunnel on the eastern shore of San Andreas Reservoir.
F. Near the intersection of Skyline Boulevard and I-280 on the eastern shore of San Andreas Reservoir.
G. Near the most pronounced point south of the spillway on the eastern shore of Lower Crystal Springs Reservoir.

Action fir3 (Phase 1) Install and maintain a total of five **helispots** located on access roads along the northern one-third of the watershed at the locations listed below. The helispots shall include a paved area with a catchment system with asphalt berms, and a water collection basin or tank capable of hold-

ing approximately 10,000 gallons from which water can be drafted.

A. In Section 25 at the fuelbreak on Montara Mountain at elevation 1,700 feet above sea level.
B. On the border of Sections 18 and 19 at the fuelbreak at elevation 660 feet above sea level.
C. In Section 21 at the fuelbreak of Sawyer's Ridge at elevation 1,180 feet above sea level.
D. North of San Andreas Lake on the access road that leads to a cottage at elevation 660 feet above sea level.
E. East of I-280 south of Highway 92 on the ridgeline trail running west from the jeep trail.

Action fir4 (Phase 1) Working with adjacent landowners, **install** two additional **hydrants** at the following locations:

A. Outside of SFPUC lands along Pilarcitos Creek near the boundary of Sections 10 and 11.
B. At the southern edge of the northernmost tract east of Interstate-280.

Action fir5 (Phase 1) Install two additional metal **water tanks** of 10,000 gallon capacity and a supporting water collection system at the following locations:

A. South of Section 19 on the east side of Old Canada Road (to be co-located with a dry hydrant).
B. At the top of the drainage north of the unnamed peak at elevation 1,793 feet above sea level in Section 31 at the western boundary of the watershed (to be co-located with a dry hydrant).

Action fir6 (Phase 1) Undertake the following improvements to provide better **access to enhance fire suppression** capabilities:

A. Repair/re-engineer Ingoing Road where culverts need to be replaced and underlayment rebuilt.
B. Work with adjacent landowners to improve road from Fassler Blvd. in Pacifica to the top of Sweeney Ridge in coordination with the GGNRA and adjacent landowners.
C. Obtain emergency access on all gates leading to Scarper Peak on Frenchman's Creek Road.
D. Align the trail running on the north side of Raymundo Road up to Phleger Estate to meet the road.

Action fir7 (Phase 1) Identify and construct road improvements including necessary **turnouts, turnarounds, and safety zones** as topography and soil characteristics permit (exact location to be determined in the field) to provide better access and enhance fire suppression capabilities.

"Fire events on the watershed pose a direct threat to water quality and quantity due to the resultant increase in erosion, siltation, and nutrient loading and the potential introduction of chemicals used to suppress fires."

Fuel Management

Action fir8 (Phase 1B) Complete the **fuel management projects** listed below in coordination with applicable agencies to reduce fuels on the watershed. In implementing these projects, adhere to the Fuel Management Standards, Guidelines, and Fuel Management Methods

Available (e.g., hand labor, tree removal, mechanical treatments, prescribed burning, grazing, and chemical treatments coordinated with the SFPUC IPM Plan) set forth in the Fire Management Element (Appendix A-1). A complete description of the fuel management projects as well as the recommended treatment and schedule is also included in the Fire Management Element.

Projects 1-12 – Eastern Edge by Residential Buffer
Recommendations: Mow grass to East Bay Hills Vegetation Management Consortium prescriptions, develop paved trial, remove exotic trees, prune oaks up 8 ft, prescribe burn west-facing slopes with coyote bush, remove gates in fence, install gates for emergency access.

Projects 13-14 – Cahill Ridge Fuelbreaks
Recommendations: Thin Douglas fir stands to standards, chip and scatter slash. In high fire hazard areas remove or prescribe burn slash.

Projects 15-19 – Ridgeline Fuelbreaks
Recommendations: Reduce fuel loads through various means, including mechanical, prescribed fire, and mowing. In addition, drill native grass seed into slopes less then 20 percent.

Project 20 – Polhemus Canyon
Recommendations: Mow roadsides and prune lower branches of woodlands. High priority areas are those areas adjacent to residential areas.

Project 21 – Telephone Line
Recommendations: Mechanically clear bush under line and thin forest.

Project 22 – Skyline Ridge
Recommendations: Thin forest stands, remove Monterey cypress, and hand thin shrubs around small oak trees.

Projects 23-24 – Skyline Blvd. To Old Canada Rd.
Recommendations: Thin forest stands, remove Monterey cypress, and hand thin shrubs around small oak trees.

Project 25 – Hwy 92
Recommendations: Remove Monterey cypress stands, conduct prescribed burns of scrub stands, mow edge of road,

Project 26 – Old Canada Rd.
Recommendations: Prune lower branches of woodlands, remove understory per prescription standards along road, and mow vegetation along road.

Projects 27-28 – Clearance around Structures
Recommendations: Comply with defensible space guidelines and mow annually.

Project 29 – Powerline Clearing
Recommendations: Remove hazardous trees and inspect lines after storms.

Fire Response

Action fir9 (Phase A) LRMS staff shall **report and provide preliminary assessment** of all fires to Division Dispatch

who will in turn call 911 and notify the watershed manager.

Action fir10 (Phase A) Following assessment and reporting of the fire, **initial response** shall be made if the fire appears to be easily suppressed. If the fire is already large or is quickly gaining intensity beyond the capability of limited water and suppression ability, evacuate and report situation and staff location to watershed dispatch.

Action fir11 (Phase A) If an **evacuation** is necessary, contact the San Mateo County Sheriff Department, the Office of Emergency Services (OES), SMCPD, and CDF; have dispatch notify SFPUC employees; and set up an incident command (IC) system and liaison with other agencies.

Action fir12 (Phase 1) Prepare and provide to affected agencies and organizations **maps and information** that depict and explain items such as special requirements within the watershed to protect water quality, safe zones, turnout locations, locations of wet and dry hydrants, helispots, fuel break locations, natural barriers, evacuation routes, and areas of limited or modified suppression. Affected agencies and organizations include but not be limited to:

A. Golden Gate National Recreation Area
B. CDF/San Mateo County Fire Department
C. San Bruno
D. Millbrae
E. Burlingame
F. Hillsborough
G. San Mateo
H. South County Fire Authority
I. Daly City
J. Woodside
K. Redwood City
L. Pacifica
M. Mid-Peninsula Open Space District
N. Filoli Estate

Fire Management Plan Implementation

Action fir13 (Phase 1) Assign the **duties of implementation of the fire management plan** and incident commander to an existing or new **LRMS staff member**.

Monitoring

Action fir14 (Phase 2) Establish **permanent transects** and vegetation plots in treatment and control areas, and measure suitable vegetation indices and physical characteristics over a 5-year period to determine effects of vegetation treatments. Guidelines include:

A. Monitoring should be done in a manner consistent with other land management agencies to obtain comparable data. Use comparable data to effectively increase sample size or to reduce demand by monitoring on staff.
B. Appropriate personnel should obtain training regarding monitoring procedures and expected program results.

C. Conduct ongoing monitoring in accordance with the monitoring plan set forth in the National Park Service Western Regional Fire Monitoring Handbook, 1992.

5.8 Safety and Security (saf)

Safety and security, as used in this context, relate primarily to human health and safety. Natural and human-induced events within the watershed that could potentially affect health and safety include: seismic events, flooding, fire, pipeline damage, toxic spills, and hazardous conditions along trails. The actions listed below identify ways the SFPUC can minimize the occurrence of such events, and if such an event should occur, set up systems for SFPUC staff to quickly and effectively respond. The actions listed below cover a range of issues (i.e., regular maintenance activities, emergency response, etc.); however, there are actions presented in other sections of this chapter which are related and should therefore be reviewed in conjunction with those listed below.

The management actions for safety and security provided in this section are divided into the following topics:

- Law Enforcement
- Safety and Security Program
- Watershed Reservoir Patrol
- Watershed Manual
- Coordination and Collaboration

Additional actions related to safety and security but more appropriately addressed in other sections include:

- fire response procedures (Section 5.7: Fire Management);
- pesticide use safety guidelines (Section 5.9: Vegetation, Soil, and Pest Management);
- required emergency response plans for all lessees (Section 5.15: Lease and Permit Requirements); and
- law enforcement training (Section 5.17: Staffing and Training).

Watershed Keeper

Law Enforcement

Action saf1 (Phase 1) Develop **law enforcement procedures** for SFPUC and LRMS staff.

Safety and Security Program

Action saf2 (Phase 1) Develop and implement an LRMS **safety and security program** that includes regular maintenance and inspection procedures for areas used by the public; trespassing control; law enforcement responsibilities; on-site risk assessment studies; a system for accident reporting; employee training; watershed fencing inspections and repair procedures; emergency response plan and drills; and a periodic program evaluation and updating, as necessary.

Action saf3 (Phase 1) Designate and train an LRMS **safety coordinator,** in coordination with BERM's Health and Safety staff, whose responsibilities shall include overseeing the implementation, evaluation, and monitoring requirements of the program, as well as training employees in safety and emergency response procedures (also refer to Action sta11).

Action saf4 (Phase 1B) Regularly **inspect and maintain** the facilities and areas used by the public, and assign responsibilities for maintenance of these facilities to the appropriate agency. The following describes some of the most common types of safety concerns to be considered related to facilities used by the public.

A. Vegetation Clearing And Management: Hazardous trees, overhanging limbs and weedy growth obstructing views and/or creating hazardous conditions, poisonous vegetation near trail, debris on trail surface.

B. Streams: Eroding streambanks near trail, drainage pipes clogged with debris causing stream overwash.

C. Roadway Crossings: Caution signs not located on trail and roadway, pavement markings for crossing inadequate, inadequate sightlines.

D. Trail Tread Surfaces: Hard-surfaced pavement cracked and uneven, soft surface tread rutted, weedy vegetation encroaching into tread, standing water and mud in tread.

E. Trail Bridges: Handrails loose; bridge decking warped, loose, or missing; bridge footings exposed from erosion; rotting structural timbers; approach rails missing.

F. Roadway Underpasses/Overpasses: Tread surface wet or full of litter and debris, lighting systems inoperable, light bulbs burned out, fencing inadequate to protect users.

G. Safety Railings: Not located in areas of need, post and footings loose, handrails missing, rotting timber, corroded steel, not long enough, not high enough for all users.

H. Boardwalks: Handrails missing; rotting timber; bench seating vandalized; post and footings loose or sinking; decking warped, loose, or missing.

I. Signage Systems: Regulatory and warning signs missing or improperly located, information signs vandalized or missing, sign posts corroded or rotting, signs vandalized.

J. Lighting Systems: Bulbs burned out; fixtures broken or vandalized; support pole/structure damaged; electrical wiring exposed, damaged, or cut; ballast inoperable.

K. Drinking Water Systems: Water not potable, spigot clogged, spigot switch inoperable, basin drain clogged, water pressure inadequate, standing water around fountain.

L. Solid Waste Disposal: Trash receptacles overflowing, vandalized, or damaged; litter and debris discarded throughout the area; illegal dumping occurring.

M. Sanitary Sewer System: Toilets clogged or inoperable, sanitary main inoperable, port-a-potty leaks, clean-outs damaged or inoperable, stalls and building vandalized, sinks clogged, standing water.

N. User Conduct: Cyclists and rollerskaters/bladers riding too fast, horses using pedestrian tread, motorized users accessing trail or area, dogs (other than for the visually impaired) on trails, after hours partying, alcohol consumption.

O. Public Parking: Pavement surface littered with broken glass and debris, parking spaces not well defined, inadequate signage, handicap spaces not provided or inadequate.
P. Erosion Control Structures on Trails: Facilities not functioning properly.
Q. Public Toilets: Need for cleaning or pumping.

Action saf5 (Phase 1B) As part of the Safety and Security Program, conduct regular, **on-site risk assessment inspections** of SFPUC watershed facilities. Guidelines for on-site inspections include:

A. Make a record of the inspections, noting where potentially hazardous situations occur, what type of hazard exists, and what user group is most likely at risk.
B. Determine the likelihood of an accident occurring at the identified hazard, relative to the amount or intensity of use or as a result of ineffective or poor design.
C. After identifying the problem area and determining the likelihood of an accident, management options include selecting one of the following four options:
    1. Risk avoidance: Prohibit use of the potentially dangerous area and reroute use until the area or facility is repaired.
    2. Risk reduction: Repair the problem area immediately, increase maintenance to the problem area, limit the intensity of use in a specific area, or post warning signs notifying users of the problem area.
    3. Risk retention: Require and obtain risk waivers from all watershed users.
    4. Risk transfer: Transfer the risk to the user by requiring the user to obtain necessary insurance prior to using the watershed.

Action saf6 (Phase 1B) Periodically and systematically **inspect** watershed perimeter **fencing, access gates, and locks** and repair/replace as required to minimize trespassing, illegal dumping, etc.

Action saf7 (Phase 1B) Develop and periodically revise an **Emergency Response Plan** which includes procedures for the following seven types of emergency situations:

A. Toxic spills and leaks.
B. Gas and water pipeline damage.
C. Damaged electric transmission and distribution lines.
D. Fire.
E. Flooding/inundation.
F. Geologic and soil-related disturbances.
G. Human injury incidents/accidents.

Guidelines for emergency response procedures include:

A. Assess adequacy of elapsed time between emergency occurrence and notification of SFPUC staff.
B. Coordinate emergency response with non-SFPUC agencies (e.g., San Mateo County, OES).

"Natural and human-induced events within the watershed that could potentially affect health and safety include: seismic events, flooding, fire, pipeline damage, toxic spills, and hazardous conditions along trails."

C. Collect information on all accidents that occur on the watershed, including type of injury, date, time, location, conditions, and activity, as well as injured party (e.g., SFPUC employee or recreationist, scientist, etc.).

D. Evaluate all accidents to determine areas that may require modifications for safety reasons.

Action saf8 (Phase 1B) Periodically conduct **emergency response practice drills** for the seven types of emergency situations (see Action saf7). Guidelines include:

A. Assessment of response time.

B. Coordination of practice drills with non-SFPUC agencies.

C. Evaluation of drill to identify areas for improvement.

Action saf9 (Phase 1B) Periodically **evaluate and update** the **safety and security program**, as necessary.

Watershed Reservoir Patrol

Action saf10 (Phase 1B) Conduct **daily boat patrols** of all Peninsula reservoirs to assess water quality emergencies, trespassing problems, or other emergency situations.

Action saf11 (Phase 1B) Maintain four LRMS patrol boats, one on each reservoir, for ongoing patrols and emergencies.

Watershed Manual

Action saf12 (Phase 1B) Develop, publish, and periodically update a **Watershed Manual** that addresses SFPUC operations and maintenance procedures, emergency response procedures, and the safety and security program. The manual shall be distributed to all applicable SFPUC personnel, contractors, and others as needed. The manual shall include, but not be limited to:

A. The names, phone numbers, and the chain of command for responsible entities/persons in charge of carrying out the applicable watershed management activities, as well as the agencies responsible for law enforcement, fire protection, and medical emergencies.

B. A description of SFPUC operations and maintenance procedures.

C. A list of public use rules and regulations.

D. Emergency response procedures for the following seven emergency situations:

1. Toxic spills and leaks.
2. Pipeline damage.
3. Damaged transmission and power lines.
4. Fire.
5. Flooding/inundation.
6. Geologic and soil-related disturbances (earthquakes, slides).
7. Human injury incidents/accidents.

E. Response procedures for non-emergency situations (e.g., illegal dump-

ing, downed trees, dead animals, etc.).

F. A set of maps of the watershed.

Coordination and Collaboration

Action saf13 (Phase 2) Work with CalTrans and San Mateo County to **install signs, emergency call boxes, and emergency response telephone numbers** on I-280 and Highway 92 about risk of fires, vehicle accidents, and risk of spills.

Action saf14 (Phase 1B) Coordinate with the San Mateo County Sheriff and Fire Departments to develop and periodically update an **evacuation plan** for use during floods, earthquakes, fires, or other natural disasters.

Action saf15 (Phase 1) Review utility emergency response plans for adequate non-SFPUC **pipeline failure procedures** in event of earthquake, landslide, or other disaster. Emergency response teams should:

A. Receive adequate notification time (the elapsed time between time of incident and time SFPUC is notified) to protect water supplies, and have a response plan which addresses how to protect the watershed from pipeline failures.

B. Facilitate coordination between pipeline owner, LRMS staff (to secure water supply), and emergency response teams.

C. Practice emergency response scenarios on various reaches of pipe with all participating agencies, and assess adequacy of the containment facilities.

D. Mark the pipeline alignment with signs at more frequent intervals.

E. Contact necessary numbers before digging, as well as emergency response telephone numbers.

F. Incorporate any BMPs and changes which specify emergency response into pipeline leases.

Action saf16 (Phase 1A) Coordinate with the GGNRA, San Mateo County Parks Department and Sheriff's Department in maintaining and enforcing the safety and security program for areas of the watershed where public access and use are allowed to occur.

Action saf17 (Phase 1) Coordinate with San Mateo County to develop a **schedule of fines and penalties** for watershed infractions.

This page intentionally left blank.

5.9 Vegetation, Soil, and Pest Management (veg)

The watershed functions as an important biological reserve in a region dominated by urban development. Various physical and climatic conditions have resulted in the establishment of diverse vegetative communities, ranging from old-growth Douglas fir forests to wetlands, which provide habitat for at least eleven special status plant species.

Management of the vegetation communities and soil resources is critical to the watershed's long-term ecological viability and maintenance of water quality and supply.

Closely related to vegetation and soil management is IPM. Watershed pests include a wide range of plants and animals including: invasive shrubs in brushland areas; weeds along roadsides; gophers and weeds on the Sunol Valley Golf Course; algae and floating plants in the reservoirs; feral pigs, cats, and dogs; insects; and introduced bullfrogs and largemouth bass in aquatic habitats. Each pest and attempts to control them have varying impacts on the watershed.

SFPUC operations, maintenance, and construction activities and/or use of watershed land by the public have the potential to adversely affect vegetation and soil resources and disturb the ecological balance within the watershed. The actions listed below articulate the management strategies related to vegetation and soil preservation, integrated pest management, and management to minimize potential effects.

The management actions for vegetation and soil management provided in this section are divided into the following topics:

- Vegetation Management Plan
- Assessment Prior to New Activities
- Restoration
- Exotic Species
- Forest Management
- Soils Management
- Integrated Pest Management
- Coordination and Collaboration

Additional actions related to vegetation and soil resources but more appropriately addressed in other sections include:

- fire management actions to reduce fuel build-up and protect sensitive vegetation (Section 5.7: Fire Management);
- protection and creation of vegetation for wildlife use (Section 5.10: Wildlife);
- staff training regarding sensitive species. Staff to review proposed plans and projects for compatibility with watershed goals and policies (Section 5.17: Staffing and Training);
- actions related to maintaining an up-to-date watershed GIS database (Section 5.19: Information Management); and

Serpentine Bunchgrass

Jepson Laurel

- actions for the review of proposed plans and projects (Section 5.20: Design and Construction Requirements).

For additional detail on relevant BMPs, refer to Appendix C-6.

Vegetation Management Plan

Action veg1 (Phase 2) Prepare and implement a **Vegetation Management Plan** which is coordinated with the recommendations set forth in the Fire Management Element and special status plant protection (see Appendix A-1). The Vegetation Management Plan shall achieve the following:

A. Develop clearly articulated vegetation management objectives based on the Vegetation Policies set forth in Chapter 4 for geographic areas ("units") on the watershed with substantially uniform conditions of slope, soil, exposure, initial vegetation type, and desired future condition.

B. Identify a long-range, recurring set of unit management prescriptions to attain and maintain these objectives. These prescriptions shall be the principal implementing mechanism of the Vegetation Management Plan. The management prescriptions shall define the desired future condition for each unit and how it shall be achieved and maintained in perpetuity. The desired future condition and prescriptions may also require coordination with other management concerns such as water yield, fire hazard reduction, and wildlife habitat.

C. Design and map units using a global positioning system (GPS) as practicable management units. They may be any size, shape, or location but should have convenient administrative boundaries. For example, if understory burning is prescribed for a unit, it should be large enough for a burn to be cost-effective, and be defined by roads or fuelbreaks where the fire would logically be contained.

D. Establish permanent transects and vegetation plots in treatment and control areas, and measure suitable vegetation indices and physical characteristics over a 5-year period to determine effects of vegetation treatments. This monitoring should be done in accordance with the guidelines set forth in the BMP appendix (C-6) and done a manner consistent with other land management agencies to obtain comparable data. Use comparable data to effectively increase sample size or reduce demand by monitoring on staff. Train appropriate personnel regarding monitoring procedures and expected program results.

E. Institute a computerized record-keeping system using GIS and supporting database programs and GPS to track vegetation management activities, including unit condition, history (e.g., last treatment date and type), and next date for subsequent monitoring and treatment. Create

a supporting database of Unit Record Cards to contain the following information: geographic location (in map and text description); initial condition (e.g., fuel loading, species composition, disease incidence, percent dead, snag densities); unit prescription; desired future condition; and next scheduled treatment. Maintain Unit Record Cards at SFPUC headquarters with a system that automatically brings a unit to the attention of managers when treatments are due (e.g., understory clearing, herbicide treatment, road maintenance, growth and survival monitoring in plantations, etc.).

Guidelines to consider when developing the Vegetation Management Plan include:

A. Follow species and habitat protection requirements specified in multi-species Habitat Conservation Plan (HCP) (Action wil9) for vegetation management.

B. Consider the autecology (reproductive strategies) of sensitive plant species when selecting the type and timing of vegetation management technique.

C. Ensure that vegetation management prescriptions take into account habitat use by legally protected species in shrub communities.

D. Conduct prescribed burns under conditions that do not harm obligate seeding species.

E. Screen and restore disturbed areas with an appropriate mix of native vegetation species.

F. Encourage analysis of complex biotic interactions such as mycorrhizal associations, pollination systems, dispersal systems, herbivory, and predation.

G. Investigate and apply where possible IPM techniques for controlling roadside vegetation including flame control, re-seeding with native grasses, and use of hot water or steam and mowing in preference to spraying of chemical herbicides.

H. Conduct surveys for known and potential special status species habitat prior to initial fuel treatments, and impose appropriate geographical or seasonal restrictions to ensure that the species and their habitat are protected from significant irreversible damage.

I. Use construction of fuelbreaks as a venue for mechanical reintroduction of native perennial grasses.

J. Develop and manage fuelbreaks for the benefit of vegetation communities. Guidelines include:

   1. Create fuelbreaks with blended or feathered edges through selective thinning and by cutting indentations in brush to create "bays."
   2. Interior areas of the fuelbreaks should retain clumps of unmodified vegetation to provide cover and food for wildlife and create interest and variety in the landscape.
   3. Implement fuelbreak conversion to perennial grasses in clay loam soils (e.g., Fagan or Felton vari-

"The watershed functions as an important biological reserve in a region quickly becoming dominated by urban development."

ant) where water storage capacity is 2 to 3 inches in the upper 3 feet.

4. Manage all fuelbreak edges to maximize linear edge (minimum 2:1 ratio of edge length to centerline) and maintain a shrub zone between trees and open areas.

K. Maintain vegetation adjacent to all facilities to create a defensible space on all sides.

L. Monitor effects of human activities and habitat alteration on systems. Track the relationship between successional stages and management actions for treated and untreated areas.

Assessment Prior to New Activities

Action veg2 (Phase A) Prior to planning or initiating any watershed activity and in conjunction with the review process for proposed plans and projects (Actions des1 and des2), **consult the GIS database**, which identifies specific vegetation communities and their associated rare, threatened, endangered, and sensitive species, to determine the level of impact of the activity on sensitive vegetation communities and species. Specific communities and areas of concern include:

A. Serpentine bunchgrass community
B. Edgewood Park
C. Roadsides, including Crystal Springs and Edgewood Roads
D. Northern Coastal Scrub community, including Whiting Ridge
E. Valley Needlegrass Grasslands community, including Sawyer Ridge
F. Annual grasslands near San Andreas Dam.

Action veg3 (Phase A) Prior to the initiation of any watershed activity that may affect a high **Ecological Sensitivity Zone**[1] and in conjunction with the review process for proposed plans and projects, conduct surveys for special status species and map observed occurrences in the GIS database. Update ESZ mapping based on surveys. Develop and implement effective mitigation measures to avoid and minimize adverse effects on species and their natural communities. Special status plant species[2] are found in the following natural communities:

[1] ESZs are defined by the presence of one or more special status plants of a manageable population size and density, or by serpentine grassland soils (Obispo variant), or by plant communities supporting populations of listed animal species.

[2]**SPECIAL STATUS SPECIES CODES**
Federal:
FE=Listed as Endangered on the Federal Endangered Species List
FPE=Proposed for listing on the Federal Endangered Species List
FT=Listed as Threatened on the Federal Endangered Species List
FC= Candidate for Federal listing (taxa for which the U.S. Fish and Wildlife Service has sufficient biological information to support a proposal to list as Endangered or Threatened)

BEPA= Bald Eagle Protection Act
State:
CE= Listed as Endangered, California Endangered Species Act
CT=Listed as Threatened, California Endangered Species Act
CSC=California Species of Special Concern
SSA=State designated special animal, designated by CDFG biologists
CFP=California Fully Protected, pursuant to CDFG Sections 3511, 4700, 5050, 5515

A. Douglas Fir/Upland Redwood Forest: Locale for California bottlebrush grass (*Elymus californicus*) (FC) and nesting habitat for the marbled murrelet (FT/SE).

B. Mixed Evergreen Forest/Coast Live Oak: Locale for San Mateo woolly sunflower (*Eriophyllum latilobum*) (FE).

C. Northern Coastal Scrub: Locale for coast rock cress (*Arabis blepharophylla*) (FC) and stonecrop (*Sedum spathulifolium*), the foodplant of the San Bruno elfin butterfly (FE).

D. Northern Maritime Chaparral: Locale for the Montara manzanita (Arctostaphylos montaranensis) (FC) and fragrant fritillary (*Fritillaria liliacea*) (FC).

E. Valley Needlegrass Grassland: Locale for San Francisco owl's clover (*Orthocarpus floribundus*) (CE).

F. Serpentine Bunchgrass: Locale for San Mateo thornmint (*Acanthamintha obovata* ssp. *duttonii*) (FE), fountain thistle (*Cirsium fontinale* var. *fontinale*) (FE), San Francisco wallflower (*Erysimum franciscanum*) (FC), Marin dwarf flax (*Hesperolinon congestum*) (FT), white-rayed pentachaeta (Pentachaeta bellidiflora) (FE), as well as owl's clover (Castilleja densiflora spp) and tidy tips (Layia platyglossa), host plants for the Bay checkerspot butterfly (FT).

G. Non-native Grasslands: Locale for San Francisco owl's clover (*Orthocarpus floribundus*) (FC), the lupine, *Lupinus albifrons*, one of the foodplants for the mission blue butterfly (FE), and the *Viola pedunculata*, the sole larval foodplant for the Callippe silverspot butterfly and the foodplant for the unsilvered fritillary butterfly (Candidates for Federal listing as endangered).

H. Coastal and Valley Freshwater Marsh, Central Coast Arroyo Shallow Riparian Forest, White Alder Riparian Forest, Pond, or Reservoir: Habitat for the San Francisco garter snake (FE/SE) and California red-legged frog (FPE).

Action veg4 (Phase A) Prior to the initiation of any construction project involving grading, a **grading plan** shall be prepared by the project proponent and approved by appropriate SFPUC staff. Revegetation of all graded areas shall be required to the maximum extent practicable. Grading plans shall include, but not be limited to, the following:

A. A map of the site, prepared at a scale of 1" = 500' or greater with contour intervals of at least 5 feet, including: pre-project land contours; post-construction land contours (finished grade); location of all areas to be graded, with cut banks and fill slopes delineated; and estimated dimensions of graded areas.

B. A narrative description of the proposed grading activity, including: its purpose; an estimate of the total volume of material to be moved; a

description of the height of all cut banks and fill slopes (may be delineated on the map); a description of the provisions to be used for compaction, drainage, and stabilization of graded areas; a description of all plant materials used to revegetate exposed slopes and banks, including type of species, number of plants, size and location (may be delineated on the map), and a description of irrigation provisions or other measures necessary to ensure the survival of plantings; and a description of any other interim or permanent erosion control measures to be utilized.

Restoration

Action veg5 (Phase 2) Develop a **native species planting program** for implementation in disturbed areas in coordination with fire management activities. Guidelines include:

A. Trees may be planted as seedlings, or 1 to 5 year planting stock, or in combination to determine relative value of approaches.

B. Acorns, seedlings, and saplings will need protection from fossorial animals and from weeds.

C. Plant the sapling in native soil/mulch with a fertilizer tablet, protect roots by a wire basket, protect the stem in a 2-foot tall tubex, tube enclosed by wire, and water the tree by drip irrigation for 5 years. This kind of intensive program may not be feasible in less accessible areas and greater mortality would be expected in broader-scale restoration areas.

D. Cultivate native planting stock from acorns and seeds gathered on watershed lands.

Exotic Species

Action veg6 (Phase 2B) Identify and remove **invasive exotic plant species** using IPM practices.

Action veg7 (Phase 2B) Identify and remove stands of **exotic forest species** such as eucalyptus (found within the hardwood forest), Monterey pine, and Monterey cypress (found in brushy areas). Guidelines include:

A. Remove new seedlings around the perimeter of existing stands as soon as possible to control spread. Eucalyptus can be controlled in early stages of growth but is able to resprout from roots once established.

B. Harvest existing stands of exotic trees for fuelwood where feasible.

C. Replant to the prescribed native vegetation if within the forest; otherwise allow natural revegetation with native species to occur.

D. Identify and preserve stands of exotic trees that serve as important overwintering roosting sites for the Monarch butterfly. Maintain stand to core habitat by removing seedlings from the perimeter.

E. Identify and preserve stands of **exotic trees** which serve to demarcate the old Spanish land grants and which are studied by geologists due to their location across the San Andreas Fault.

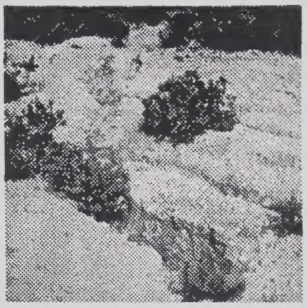
Forest Management

Action veg8 (Phase 2) Develop **forest management prescriptions** and guidelines for both hardwood and coniferous tree species.

Soils Management

Action veg9 (Phase A) When conducting operations, maintenance, and construction activities follow **erosion control BMPs** to ensure protection of wetlands, streams, and shoreline areas. BMPs provided in Appendix C-6 to be employed in the vicinity of wetlands and riparian areas shall be coordinated with the requirements of the CDFG Streambed Alteration Agreement (Action aqu13) and Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers (COE). Guidelines include:

A. Schedule grading to avoid the rainy season.
B. Stipulate disposal practices for excess material.
C. Retain existing vegetation wherever feasible.
D. Divert runoff from denuded areas.
E. Minimize length and steepness of slopes.
F. Use sediment control measures to trap sediment on-site.
G. Inspect, monitor, and maintain sediment control measures.
H. Minimize the total area, duration, and season of soil exposure and enforce strict controls on soil excavation, fill, and storage.
I. Minimize discing by mowing roadside and trailside areas to reduce erosion potential.
J. Restrict discing to slopes no greater than 5 to 8 percent, where practicable.
K. Conduct all forest management activities in accordance with BMPs specified by the California Forest Practices Rules (Title 14 CAC) included in Appendix C-6.
L. Minimize the disturbance of serpentine bedrock or soils to prevent erosion of asbestos fibers into water supplies.



Southern Watershed Erosion

Action veg10 (Phase 1) Identify areas subject to **slope instability** and failure based on the soils, geology, and landslide data layers in the GIS. Prevent erosion by implementing the applicable BMPs. Assign the highest priority for protection to areas immediately adjacent to the reservoirs and their main tributaries; assign second priority to other unstable, eroded, or erodible hillslopes. Guidelines include:

A. Avoid placing erosion and sediment control features that increase infiltration and subsequent soil moisture on slopes that have a high probability of landslide failure.
B. Use native grass mix to seed infrequently used fire roads and emergency access roads.
C. Maintain infrequently used roads by mowing rather than by grading to reduce erosion and sedimentation rates.
D. Cover infrequently used roads with chip material to stabilize.

Action veg11 (Phase 1) Identify and indicate in the GIS areas where prior land disturbance has accelerated **mass movement or soil erosion** processes to unacceptable levels (i.e., the critical point where natural stabilizing factors cannot recover without human intervention). Record these areas in the GIS. Stabilize these areas using biotechnical methods and soil conservation BMPs. Areas of chronic gullying or downslope soil creep, flow, or sliding that require repeated road or sediment basin maintenance should be assigned highest priority. Guidelines include:

A. Cover disturbed areas with duff, chips, or mulch to prevent non-native species invasion (e.g., pampas grass).
B. Re-seed with fast-growing annual grasses to out-compete invasive species and treat as required with prescribed burns.
C. Rehabilitation may exclude, relocate, or modify land use activities and/or require slope re-contouring and revegetation.
D. Avoid placing erosion and sediment control features that increase infiltration and subsequent soil moisture on slopes a high probability of landslide failure.
E. Slope rehabilitation and revegetation should be based on techniques developed for long-term success (rather than for short-term construction site management) from sources such as the Natural Resources Conservation Service (NRCS) National Engineering Handbook Series (Part 650), Chapters 10 (Gully Treatment) and 18 (Upland Slope Protection).
F. Cover exposed soils of firelines and burned slopes, subject to accelerated erosion rates, with the vegetative material displaced during construction or by distributing duff, litter, or chips rather than the application of hydromulch.
G. Use reseeding with hydromulch only in areas of severe ground disturbance.

Action veg12 (Phase 2B) Establish and conduct **long-term hillslope erosion and sediment control monitoring** to evaluate the effectiveness of adopted protection measures and/or rehabilitation projects and to confirm/validate the identified risk areas mapped on the GIS. The monitoring program should be designed to provide quantitative, systematically collected information. Monitoring may use representative hillslope areas within selected sub-basins that have varied land use types and intensities and should include controls for natural variability in lithology (rock type), geologic structure, slope angle/aspect, and the different slope and soil protection or rehabilitation methods.

Integrated Pest Management

Action veg13 (Phase 1) Develop and implement an **IPM Program for the LRMS, specific to the watershed** and watershed resources, within the framework of the City and County of San Francisco's City Pesticide Management

Plan Ordinance (No. 274-97) and the SFPUC Draft IPMP (October 1997). Guidelines specific to implementation of the IPMP on watershed lands include:

A. Survey pest control problems on watershed lands, including: weed and gopher control on golf courses; invasive shrubs in brushlands; introduced trees in woodlands; mosquito larvae in standing water; insect and fungal diseases in natural plant communities; feral pigs, cats, and dogs in terrestrial habitats; animal populations that act as vectors of diseases transmittable to humans; introduced bullfrogs and largemouth bass in aquatic habitats; predators near livestock operations; and cockroaches, commensal rodents, spiders, ants, wasps, and termites in buildings.

B. Design specific procedures to address the varied needs for protection in high and moderate WQVZs and other sensitive water quality and ecological resource areas. Procedures to be employed in aquatic habitats or in the vicinity of wetland and riparian areas shall be coordinated with the requirements of the National Marine Fisheries Service (NMFS) (regarding restrictions for Federally endangered fish species), USFWS (regarding restrictions for Federally endangered plant and animal species habitat), the CDFG (regarding restrictions for state endangered species habitat and conditions for 1601 blanket agreement), and the COE (regarding conditions for a Section 404 permit in regulated wetlands and waters of the U.S.).

C. LRMS approval is required for all pesticide uses that involve direct application to aquatic environments, use in high and moderate WQVZs and ESZs, or under conditions in which the applied pesticide could reasonably be expected to get into water bodies.

D. Enforce geographic restrictions to pesticide application, especially in high and moderate WQVZs and other sensitive areas.

E. Enforce seasonal use restrictions for authorized pesticide applications in aquatic habitats during the nesting season (first of March to the end of June) and during the anadromous fish season (October 15 to March 15), or as recommended by the resource and regulatory agencies.

Coordination and Collaboration

Action veg14 (Phase 1) Coordinate with **PG&E** in **clearing vegetation**, as appropriate, under and around powerlines, transformers, and pole structures. Guidelines include:

A. Ensure that the minimum amount of vegetation is removed.

B. Ensure protection of the vegetation resources during removal.

C. Determine the method of treatment and degree of clearance based on site factors such as slope and soils.

Action veg15 (Phase 2A) Collaborate with the CNPS and CalTrans in **restoring native plant communities** along the **I-280 right-of-way** through serpentine substrates.

Action veg16 (Phase 1) Coordinate with CDFG's restoration efforts of the **San Mateo thornmint habitat** in the Edgewood Triangle area of the watershed.

Action veg17 (Phase 1) Encourage other agencies with interest in watershed lands to minimize the disturbance of **serpentine bedrock or soils** to prevent the erosion of asbestos fibers into the water supply.

5.10 Wildlife (wil)

Wildlife on the watershed are plentiful, diverse, and play an important role in the predominantly urban region in which the watershed occurs. The importance of the watershed to wildlife is not only related to the immediate habitat opportunities, but also to wildlife movement, and for migratory birds as a stopover along the Pacific Flyway. Special status species known to occur in the watershed include, among others, the: California red-legged frog, Northwestern pond turtle, bald eagle, great blue heron, burrowing owl, the pallid bat, and three species of butterflies. Preserving these species and their habitat is an integral part of maintaining the ecological balance and sustainability of the watershed.

To ensure the long-term protection of wildlife, this section presents actions focused on monitoring and regulating new and existing activities within the watershed. Strategies for the preservation, enhancement, and maintenance of wildlife movement corridors and special status species and future studies and monitoring activities are also presented.

The management actions for wildlife provided in this section are divided into the following topics:

- Assessment Prior to new Activities
- Wildlife Movement
- Wildlife Habitat
- Sensitive, Rare, Threatened, and Endangered Species
- Future Studies and Monitoring
- Coordination and Collaboration

Additional actions related to wildlife management but more appropriately addressed in other sections include:

- staff training regarding sensitive species and habitat and staff to review proposed plans and projects for compatibility with watershed goals and policies (Section 5.17: Staffing and Training);
- actions related to maintaining an up-to-date watershed GIS database (Section 5.19: Information Management); and
- actions for the review of proposed plans and projects and fencing prior to construction activities (Section 5.20: Design and Construction Requirements).

Bay Checkerspot Butterfly

Assessment Prior to New Activities

Action wil1 (Phase A) Prior to planning or construction and in conjunction with the review process for proposed plans and projects (Actions des1 and des2), conduct **site-specific review of new structures**, linear facilities, parking lots, roads, or trails to be located in any habitat to avoid and minimize adverse impacts to wildlife, their movement, and habitat. Where new facilities are needed, adhere to the following guidelines:

A. Consolidate siting of linear facilities, such as trails and utility corridors, to the periphery of the watershed.
B. Design projects to maintain connectivity between habitat types.
C. Minimize stream crossings and locate facilities outside of moderate and high WQVZs.

Action wil2 (Phase A) Conduct comprehensive (if broad-based activity) or site-specific surveys of affected habitats to more completely determine the presence or absence of listed or sensitive taxa. When making decisions related to **watershed activities** that may affect high ESZs, develop and implement effective mitigation measures to avoid and minimize adverse effects on species and habitat. Specific requirements and guidelines include:

A. Clear deadwood and perform timber operations outside of bird breeding season or conduct bird nesting surveys prior to operations.
B. Prevent disruption to any breeding areas encountered during surveys or operations.
C. Evaluate old structures (barns, buildings, tunnels) or disturbed areas to determine if they are being used by species with specialized habitat needs (e.g., bats, owls, nesting raptors) prior to conducting restoration and/or demolition.

Wildlife Movement

Action wil3 (Phase 3) Identify and protect **primary wildlife movement corridors** such as riparian corridors, and design fencing, culverts, stream crossings, and underpasses to accommodate wildlife passage.

Action wil4 (Phase 3) Relocate or **eliminate unnecessary infrastructure** and facilities as opportunities arise to reduce fragmentation and disruption of terrestrial habitat over the long term.

Action wil5 (Phase 3) Evaluate fencing needs and **remove unnecessary or relocate fencing** as necessary to manage wildlife movement.

Wildlife Habitat

Action wil6 (Phase 3) Establish a **standard for number of snags**/fallen trees/nesting trees per acre by vegetation types and implement and protect them for wildlife use and nutrient cycling. Downwood and brush piles should be left as habitat and cover where safety and fire hazard are not concerns.

Action wil7 (Phase 3A) Create palatable **re-sprouting browse** through mechanical vegetation treatments or prescribed fire in brush and woodland communities.

Sensitive, Rare, Threatened, and Endangered Species

Action wil8 (Phase 1A) Periodically update the LRMS sensitive species database for the watershed, including mapped locations of occurrences and specialized

habitats, listing status, and current population trends. At the time of plan preparation, animals listed or proposed for listing on Federal and State Endangered Species Lists[1] (California Administrative Code, Title 14, Section 670.5; Federal Register, 50 CFR 17.11) and known to occur, or with a potential to occur, within existing specialized habitat on Peninsula Watershed lands include the following:

Listed and Proposed Species, Peninsula Watershed (10/96)

A. Invertebrates: Bay checkerspot butterfly (serpentine habitat) (FT); mission blue butterfly (grassland) (FE), San Bruno elfin butterfly (coastal scrub, essential habitat off Whiting Ridge within SFWD lands) (FE), and Callippe silverspot (grasslands with *Viola pedunculata*) (FPE).

B. Reptiles and Amphibians: California red-legged frog (ponds and quiet waterways with emergent vegetation) (FPE) and San Francisco garter snake (important habitat throughout reservoir wetlands and ponds) (FE).

C. Birds: Bald eagle (winters on lakes, reservoirs, rivers) (FT), American peregrine falcon (FE) (cliffs, outcrops, current nesting in area), and marbled murrelet (FT) (proposed Critical Habitat in old-growth conifers in Pilarcitos drainage).

D. Mammals: None.

Candidate Species and Other Species of Concern, Peninsula Watershed (10/96)

E. Invertebrates: Opler's longhorn moth, serpentine phalangid, monarch butterfly, Ricksecker's water scavenger beetle, Leech's skyline diving beetle, San Francisco forked-tailed damselfly, Edgewood blind harvestman, Edgewood Park microblind harvestman, San Francisco lacewing, and unsilvered fritillary.

F. Reptiles and Amphibians: California tiger salamander, foothill yellow-legged frog, western spadefoot toad, southwestern pond turtle, northwestern pond turtle, and California horned lizard.

G. Birds: Cooper's hawk, sharp-shinned hawk, northern harrier, black-shouldered kite, California horned lark, merlin, loggerhead shrike, osprey, and saltmarsh common yellowthroat.

H. Mammals: Pallid bat, Townsend's big-eared bat, greater western mastiff bat, ringtail, and American badger.

"The importance of the watershed to wildlife is not only related to the immediate habitat opportunities, but also to wildlife movement, and for migratory birds, as a stopover along the Pacific Flyway."

Action wil9 (Phase 2) Achieve regulatory compliance by developing a comprehensive, multi-species **Habitat Conservation Plan** for the species of concern on the watershed and the actions set forth in this Watershed Management Plan and other known activities to be conducted by SFPUC over the next 50 years which may significantly and broadly affect one or more species of concern. The HCP shall be prepared in cooperation and consultation with USFWS, NMFS, and CDFG for activities affect-

[1] See list of Special Status Species Codes in Section 5.9: Vegetation, Soil, and Pest Management.

ing species protected under the Endangered Species Act (e.g., California red-legged frog, steelhead trout, etc.). Obtain an incidental take permit for authorized activities from the USFWS based on the approved HCP.

Generally, a specific component of the HCP is prepared for each species. Specific guidelines for the San Francisco garter snake (SFGS) and the California red-legged frog (CRLF) component of the HCP may include but are not necessarily limited to:

A. Develop a vegetation management/habitat enhancement strategy based on scientifically sound information.

B. Census and monitor current SFGS and CRLF populations, and provide for implementing management decisions based on monitoring and census results. Monitoring should be ongoing, using marked plots; schedule and protocol of sampling to be determined in coordination with resource specialists at CDFG and USFWS.

C. Delineate protected buffer areas around wetland/riparian and shoreline zones (i.e., Watercourse and Lake Protection Zones [WLPZ]) based on site-specific data. These zones shall be based on the presence of suitable habitat (aquatic and terrestrial) and direct observations. Activities within the protection zones should be permitted only in late autumn through winter, when target taxa are less vulnerable. In the absence of site-specific information, treat all WLPZs as protected areas.

D. Coordinate removal of exotic vegetation with IPM Program discussed elsewhere.

E. Activities to be regulated or seasonally prohibited within protective buffer zones should include but not be limited to: removal of fill in sedimentation basins; reservoir level fluctuations; dewatering of habitat; mowing; application of pesticides; removal of emergent aquatic vegetation; mosquito abatement; and road grading and maintenance.

F. Consider construction of subimpoundments at various locations within the reservoir drawdown zone to create pockets of annual or extended seasonal inundation, which would provide additional stable seasonal wetland habitat for SFGS and CRLF unless subject to reservoir water level fluctuations.

G. Consider regulation of reservoir drawdown as a management tool; maintain water levels in June and July with drawdown in late August to benefit SFGS and CRLF, and reduce bullfrog and predatory fish populations in shallow coves.

H. Consider the following additional management measures: evaluate predation and predator control (e.g., bullfrog and largemouth bass); route pedestrian traffic away from marsh areas, especially Mud Dam and northern San Andreas Reservoir; when vegetation is cleared or thinned near snake habitat, leave it in piles

to act as refugia; and clear vegetation from face of Mud Dam for Division of Dam Safety inspection in middle of winter only.

Action wil10 (Phase 1) Institute **seasonal prohibition of activities** during breeding periods and enact appropriate mitigation measures (e.g., buffer zones, restricted access) to adequately protect special status or sensitive species in the absence of site-specific surveys. Special status species can be categorized as follows:

A. Plants or animals listed or proposed for listing as rare, threatened, or endangered under the California Endangered Species Act (CESA or Federal Endangered Species Act (FESA).
B. Plants or animals that are candidates for possible future listing as threatened or endangered under FESA.
C. Plants included on lists 1A, 1B, and 2 of the CNPS *Inventory of Rare and Endangered Vascular Plants of California* (Skinner and Pavlik 1994).
D. Animals designated by CDFG as "species of special concern."
E. Individuals, nests, and eggs of the order Falconiformes (falcons, kites, and hawks) and Strigiformes (owls) under §3503/3503.3 of the Fish & Game Code.
F. Animals that have been designated as "Protected" or "Fully Protected" by the Federal government under law (e.g., BEPA).

Future Studies and Monitoring

Action wil11 (Phase 1) Inventory and map **butterfly habitat**. Encourage research into the relationship between butterflies and host plants; manage host plant populations to provide maximum benefit to butterfly species.

Action wil12 (Phase A) Monitor the **effects** of **natural processes** (e.g., fires, fog, drought, wind, erosion, rock slides, mud slides, and flooding) that are essential in maintaining the variability of the ecosystem, yet could have negative impacts if specialized or critical habitats of sensitive wildlife species are significantly affected.

Action wil13 (Phase 3B) Monitor predator-prey relationships to provide a basis for management and control, specifically for ground squirrels, golden eagles, mountain lions, coyote, and deer.

Action wil14 (Phase A) Monitor the number and type of **road kills** that occur within the watershed to better understand wildlife movement patterns. Design and install wildlife passage structures that minimize losses based on monitoring surveys.

Action wil15 (Phase 2B) Monitor populations of **pest animals** such as feral cats, wild dogs, ground squirrels, and feral pigs to evaluate success in meeting population targets and to provide information for modifying control programs.

Coordination and Collaboration

Action wil16 (Phase 1A) Support and cooperate with the **CDFG** in their **efforts** to monitor and enforce State rules and regulations on the Peninsula Fish and Game Refuge.

5.11 Aquatic Zone Protection (aqu)

Protection of reservoir shorelines and streambanks is integral to the long-term sustainability of the watershed. Activities within this sensitive zone can increase erosion and sedimentation, which directly affects water quality, quantity, and biological resources. The actions presented in this section are focused on the management and preservation of the aquatic zone, with an emphasis on stabilizing channels and banks, reducing erosion, maintaining stable water elevations, restricting land uses, and managing sediment movement.

The aquatic zone as referred to in this section is generally coterminous with the high WQVZ defined for the Peninsula Watershed (Figure 2-3). Limiting activities and controlling disturbance in these zones protects against delivery of sediment generated by adjacent upslope land use activities and also helps prevent contaminants from entering the streams and waterbodies.

The management actions for aquatic zone protection provided in this section are divided into the following topics:

- Assessment Prior to New Activities
- Reservoirs and Reservoir Shorelines
- Stream Channels and Banks
- Wetlands
- Sedimentation Basin Management
- Monitoring

Additional actions related to aquatic zone protection but more appropriately addressed in other sections include:

- actions to control and capture stormwater runoff (Section 5.2: Stormwater);
- actions to reduce road-related runoff (Section 5.5: Roads);
- actions to reduce the contribution of sediment into the reservoirs and to implement IPM strategies (Section 5.9: Vegetation, Soil, and Pest Management);
- actions for wildlife protection (Section05.11: Wildlife);
- staff to review proposed plans and projects for compatibility with watershed goals and policies (Section 5.17: Staffing and Training); and
- actions for the review of proposed plans and projects (Section 5.20: Design and Construction Requirements).

Pilarcitos Creek

Assessment Prior to New Activities

Action aqu1 (Phase A) Prior to undertaking or constructing any non-water-dependent facility or watershed activity, **conduct site-specific review** in conjunction with the review process of proposed plans and projects (Actions des1 and des2) to ensure that the facility or activity is not located within a High WQVZ. If feasible, relocate the activity or facility to an alternative upland site. If no feasible site exists, follow BMPs as set

forth in Appendix C-6 and minimize stream crossings.

Reservoirs and Reservoir Shorelines

Action aqu2 (Phase 1) Coordinate with the Systems Operations Section of the Water Supply and Treatment Division to **manage reservoir water levels** to maintain relatively stable water levels, where feasible subject to operational requirements and water availability, to maintain shoreline emergent vegetation and minimize shoreline erosion.

Action aqu3 (Phase 1) Identify and **prioritize for rehabilitation reservoir shoreline areas** within the High WQVZ which are providing excessive sedimentation into the reservoirs.

Action aqu4 (Phase 1A) Where possible, **prohibit** or regulate the timing or intensity of **land use activities** in the high risk shoreline segments identified in Action aqu3 consistent with other management actions in this Plan.

Action aqu5 (Phase 1) Rehabilitate shoreline areas using structural shoreline protection practices in areas where erosion and sedimentation cannot be adequately controlled by land use restrictions. Specific practices may vary by site and risk factors, but should include the following:

A. If the dominant risk factor is concentrated runoff from upslope roads, install and maintain erosion-protected outfalls that extend far enough through the shoreline zone to safely convey runoff to the reservoir for the normal range of water levels under anticipated reservoir operations.

B. In areas where perennial surface runoff can provide water during low reservoir water levels, use vegetative methods for shoreline protection. Since the shorelines of the reservoirs are not natural but may have naturalized plant communities and/or wetland areas, revegetation for the purpose of erosion control must be consistent with wetlands habitat enhancement management actions under Section 5.9: Vegetation, Soil, and Pest Management (e.g., vegetative stabilization of shorelines may be in the form of sub-impoundments within the reservoir drawdown zone).

C. In areas where no biological resources would be jeopardized and the shoreline conditions are too adverse for vegetative stabilization to be successful, use geotechnical methods of shoreline protection (e.g., concrete riprap, geotextiles).

D. Inspect shoreline areas during and following major water level fluctuations that occur as part of reservoir operations or due to natural climatic variability. Evaluate and rate the effectiveness of protection measures and update the GIS database identifying high risk segments.

E. Monitor shoreline erosion and sedimentation based on long-term observations at selected locations representative of various types of

high risk segments and different protection measures.

Stream Channels and Banks

Action aqu6 (Phase 1) Conduct **a Sediment Transport Study** to identify stream segments with excessive bank erosion or channel sedimentation which are contributing excessive sediment to the streams; prioritize segments for rehabilitation based on their relative contribution to reservoir sedimentation and the relative risk to aquatic resources. Areas of bank undercutting and retreat and channel widening, aggradation, or braiding should be assigned highest priority for rehabilitation.

Action aqu7 (Phase 2) Rehabilitate stream segments according to the determined priorities, and return them to a dynamic equilibrium where the channel is stable. Guidelines include:

A. Base rehabilitation on soil bioengineering techniques developed for long-term success (rather than for short-term construction site management) from sources such as the Natural Resources Conservation Service (NRCS) National Engineering Handbook Series (Part 650) Chapter 16, Streambank and Shoreline Protection.
B. Use geomorphic reconstruction to ensure long-term channel stability.
C. Limit geotechnical bank stabilization to locations where pre-existing infrastructure prevents geomorphic or biotechnical methods from success.

Action aqu8 (Phase 2B) Establish and conduct long-term **stream corridor monitoring** to evaluate the effectiveness of adopted protection measures and/or rehabilitation projects. The monitoring program should be designed to provide quantitative, systematically collected information that includes measurement of channel and bank morphology, sediment load, and channel stability/performance at representative streamflows.

Wetlands

Action aqu9 (Phase A) Create new **wetland** habitat, where water sources are adequate, as part of a wetland mitigation banking system to be used to offset impacts to wetlands from SFPUC activities on the watershed and on other SFPUC lands. Possible wetland creation sites include installation of subimpoundments along reservoir perimeters. Seasonal wetland habitat could be increased for species such as the California red-legged frog, the San Francisco garter snake, the California tiger salamander, and the Western pond turtle.

Sedimentation Basin Management

Action aqu10 (Phase 2) Develop a **sedimentation basin and pond management program** that specifies type, location, and maintenance schedules for facilities and specifies restricted periods for maintenance of facilities located in wetland and riparian areas. Guidelines for the development of a sedimentation

"Activities within the sensitive aquatic zone can increase erosion and sedimentation, which directly affects water quality, quantity, and biological resources."

basin and pond management program include:

A. Evaluate existing ponds, which are functioning as sedimentation collection basins; where needed, construct, operate, and maintain additional sedimentation collection basins.
B. Manage sedimentation basins and ponds that have well-developed wetland habitats for wildlife use in particular.
C. Consider locating new sedimentation basin and pond facilities in upstream, off-channel locations that can be more easily maintained as water quality protection facilities (i.e., cleaned frequently to maintain capacity and eliminate vegetation growth).

Action aqu11 (Phase A) Once sediment detention basins are in place, establish **monitoring**, cleanup, and dredging **guidelines** dependent on sediment loading rate. Sediment accumulation in detention basins should be analyzed for concentrations of toxic materials and heavy metals. The accumulation of total organic carbon should be monitored and managed to prevent high loadings being discharged into waterbodies.

Action aqu12 (Phase A) If needed for fire management, **install** long-term **sediment retention basins** that can be readily maintained, or implement other permanent measures to prevent gully erosion in preference to installing temporary straw bale structures that decay and release stored sediments into water bodies. Do not use organic materials like straw bales within High WQVZs without post-construction removal of the materials and accumulated sediment.

Action aqu13 (Phase 2) In conjunction with development of the HCP described in Section 5.10: Wildlife and the sedimentation basin management program (Action aqu10), obtain a "blanket" **Streambed Alteration Agreement** (MOU) from the CDFG (under Section 1601 of the State Fish and Game Code) for development, operation, and maintenance of sediment detention basins or other water management facility to ensure compatibility with fisheries and aquatic habitat requirements.

Monitoring

Action aqu14 (Phase 2B) Periodically **update the Bathymetry Study for the Peninsula reservoirs** to assess the impacts of stream and sedimentation basin rehabilitation on reduction in sediment transport.

5.12 Fishery Resources (fis)

The three reservoirs of the watershed and their tributaries contain limited coldwater fishery resources. Rainbow trout, an indigenous species of the watershed, has been collected within the watershed in recent years. Other indigenous species which could potentially occur (i.e., Sacramento sucker, tule perch, and various scuplpin species) appear to be either absent or few in number.

Maintaining high water quality and adequate water quantity has a direct impact on the survival and reproduction of fishery resources. The actions set forth in this section are focused on increasing coordinated efforts between the SFPUC and CDFG for the protection of sensitive fish species, as well as overall management and preservation of fish migration opportunities and habitat management. Future studies and monitoring identified below will play an integral role in the ongoing application and refinement of these actions.

The management actions for fishery resources provided in this section are divided into the following topics:

- Fish Migration
- Habitat Management
- Future Studies and Monitoring
- Coordination and Collaboration

Additional actions related to fisheries management but more appropriately addressed in other sections include:

- maintenance and management of stormwater flows (Section 5.2: Stormwater);
- measures to prevent and control hazardous spills (Section 5.3: Hazardous Materials and Contaminants);
- erosion control measures and measures to implement IPM procedures (Section 5.9: Vegetation, Soil, and Pest Management);
- preparation of an HCP for species of concern including steelhead trout (Section 5.10: Wildlife); and
- general actions to protect reservoir shorelines, streams, and wetlands (Section 5.11: Aquatic Zone Protection).

"Maintaining high water quality and adequate water quantity has a direct impact on the survival and reproduction of fishery resources."

Fish Migration

Action fis1 (Phase 1) Maintain **access for fish species of concern** from reservoirs to upstream spawning grounds in streams tributary to the Peninsula reservoirs by eliminating unnecessary artificial barriers, creating fish passage structures, and allowing sufficient flows (where regulated) during critical breeding periods.

Action fis2 (Phase 2) Identify all **unauthorized stream diversions** and remove those that are detrimental to fish passage in adherence to all existing regulations.

Action fis3 (Phase 2B) Ensure that any **subimpoundments**, located within perennial or intermittent drainages along the periphery of reservoirs for enhancing wetland and aquatic habitat, are designed to allow fish passage.

Action fis4 (Phase 2A) Where stream alterations and diversions exist or cannot be avoided, consult with CDFG regarding **installation of fish screens and/or fish passage structures** to prevent entrapment and mortality.

Habitat Management

Action fis5 (Phase 2) Allow an appropriate level of **accumulation of woody debris** to occur in stream channels, consistent with CDFG recommendations, to create pools and riffles, reduce bank steepness, and provide cover, especially in stream reaches subject to heavy grazing in the past.

Action fis6 (Phase 1) Identify and adopt alternative **non-toxic management practices** for the protection of aquatic resources in coordination with the IPM program (Action veg13). Guidelines include:

A. Minimize use of copper sulfate in the treatment of algal blooms in reservoirs.
B. Dechlorinate water before it is discharged to streams and reservoirs.
C. Limit use of chemical fire retardants and Class A foams (except protein-based foams) in or near aquatic zones.

Action fis7 (Phase 1A) Dechlorinate the **water discharged** from the Pulgas Water Temple into Upper Crystal Springs Reservoir via chemical means.

Action fis8 (Phase 2B) Conduct strictly **regulated non-native fish depredation** in conjunction with CDFG to control populations of predaceous exotic game fish, such as largemouth bass, in reservoirs.

Future Studies and Monitoring

Action fis9 (Phase 2B) Conduct **annual surveys** of fish populations and habitat conditions in conjunction with water temperature and water quality monitoring. Select representative habitat sites for long-term, systematic monitoring.

Action fis10 (Phase A) Conduct studies such as aquatic habitat and fish population **surveys**, smolt trapping, and water temperature monitoring in coordination with CDFG regarding management of the Peninsula Fish and Game Refuge.

Action fis11 (Phase 1A) Participate in the **Pilarcitos Creek Restoration Project** as a member of the Advisory Committee and cooperate in achieving consensus goals for restoration and enhancement of the creek. Assist in annual cleanup of the creek. Conduct further studies as necessary to determine the feasibility of establishing a trout fishery on

Pilarcitos Creek through a water release and recapture program.

Coordination and Collaboration

Action fis12 (Phase 1A) Cooperate with State implementation of programs to **increase salmon and steelhead** populations where consistent with water quality and supply objectives.

This page intentionally left blank.

5.13 Cultural Resources (cul)

The geography and abundant resources offered by the watershed have yielded a long history of human occupation. Archaeological records indicate that this history extends as far back as 5,400 years ago, to the first Spanish exploration of the area in 1769, and up to the present day. Numerous archaeological sites and historic features and structures associated with this diverse and long-standing occupation occur on the watershed, including two historic resources which were recently added to the ~~National Register of Historic Places~~ (NRHP).

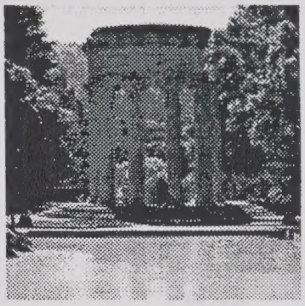
Activities that could potentially disturb known and currently unknown resources include operations, maintenance, and construction activities. The following actions provide the framework for future review procedures (e.g., prior to authorizing new construction activities), as well as the ongoing protection and maintenance of known resources and monitoring of approved construction operations.

The management actions for cultural resources provided in this section are divided into the following topics:

- Assessment of New Activities
- Protection of Existing Resources
- Monitoring

Additional actions related to cultural resources include:

- staff training pertaining to cultural resources protection and review of proposed plans and projects for compatibility with watershed goals and policies (Section 5.17: Staffing and (Section 5.20: Information Management); and
- actions for the review of proposed plans and projects and requirements for new construction (Section 5.21: Design and Construction Requirements).



Pulgas Water Temple

Assessment Prior to New Activities

Action cul1 (Phase A) Conduct appropriate levels of **review** in conjunction with the review process for proposed plans and projects (Actions des1 and des2) **prior to** operations and maintenance activities as well as construction activities involving **surface disturbance** (e.g., ground clearing, discing, grading, mechanical brush removal, and prescribed burns) and/or excavation to avoid damage to buried cultural resources in the vicinity of known sites and within mapped cultural sensitivity zones. Sensitivity zones generally include valley floors adjacent to water sources, other flat terrain near creeks and springs, and level areas along ridgetops. Guidelines include:

A. Prior to any excavation activities, request a database check from the watershed GIS operator and the State of California database for any

"The geography and abundant resources offered by the watershed have yielded a long history of human occupation."

known cultural resources or sensitive areas within the vicinity of proposed excavation activity.

B. Authorize archival research and field reconnaissance by a certified specialist or archeologist of any proposed project site and vicinity of proposed surface disturbance and/or excavation.

C. Consult with the applicable local Native American tribes as required by Federal, State, and local legal requirements when considering subsurface testing and excavation of prehistoric archaeological sites. All aspects of proposed actions shall be addressed including the treatment of cultural materials and in particular the removal, study, and reinternment of Native American burials.

D. Recommend project modifications or alternative sites that would avoid adverse effects to highly sensitive and significant cultural resource sites and features, including developing and implementing mitigation measures in accordance with all applicable State and Federal laws.

Action cul2 (Phase A) Authorize **data recovery** by qualified professionals in circumstances where archaeological deposits cannot be preserved through avoidance or protection measures. Guidelines for data recovery include:

A. Work shall be accomplished within the context of a detailed research design program conducted with current professional standards.

B. Research design program shall result in the extraction of sufficient volumes of archaeological data so that important regional research considerations can be addressed.

Protection of Existing Resources

Action cul3 (Phase A) When considering **demolition of an historic structure**, consult with an architectural historian to determine the feasibility and suitability of relocation; although the integrity of setting would be lost, the structure would be preserved.

Action cul4 (Phase A) Evaluate and document the significance of **cultural resources** threatened by demolition through application of criteria set forth in Secretary of Interior's Standards and Guidelines, State CEQA Guidelines, and the California Register of Historic Places. Where applicable, recommend registration of cultural resources deemed to be eligible for the NRHP and the California Register of Historic Places.

Action cul5 (Phase A) Employ nondestructive methods when undertaking research activities, to the maximum extent feasible and where practical, to leave the features of sites and structures in place. Data, objects, and specimens recovered from research sites shall be conserved and curated according to legal requirements.

Action cul6 (Phase A) Suspend excavation activities in the event that suspected cultural resources are uncovered; consult with a qualified archeologist regarding the significance, disposition, and treatment of artifacts; and revise, as necessary, excavation plans to avoid and/or minimize damage to known cultural resources.

Action cul7 (Phase A) Suspend excavation activities in the event that **human remains** are discovered and immediately inform the county coroner. Consult with a qualified archeologist to determine if the remains are of Native American origin, and if so, contact the California Native American Heritage Commission to identify most likely descendants for instructions regarding the treatment and disposition of human remains and associated grave artifacts.

Action cul8 (Phase A) When previously **unknown cultural resources** are discovered, report new findings to the California Historical Resources Information System (Information Centers) using standard descriptive methods.

Action cul9 (Phase 2) Implement **protective measures,** where necessary, to eliminate and minimize potentially negative effects of public access on cultural resources. Guidelines include:

A. Cover fragile cultural deposits and features with imported soils (and possibly non-intrusive landscaping).
B. Install compatible fencing to restrict physical access but allow viewing of trail-side archaeological sites.
C. Allow access to highly significant sites only through supervised tours.

Action cul10 (Phase A) Prior to initiating new construction, **consider reuse** of existing historic structures for departmental uses. Prior to modifying historic structures, an architectural historian shall be consulted to determine the feasibility and suitability of any modifications.

Action cul11 (Phase 2B) Periodically **inspect historic structures** for pest damage and use IPM techniques to control pests in historic structures.

Monitoring

Action cul12 (Phase 2B) Periodically **monitor known significant cultural resource sites** for evidence of disturbance, damage, or vandalism.

This page intentionally left blank.

5.14 Environmental Compliance (env)

Adoption and implementation of the Watershed Management Plan triggers the need for environmental review pursuant to CEQA. As described in Section 2.18, a program-level EIR is being prepared for adoption of the Plan. Implementation of individual projects and activities identified within the Plan may be subject to subsequent, project-level environmental review under CEQA. Such analysis would tier off of the program-level EIR. In addition to environmental review, implementation of some of the activities identified in the Plan may trigger the need to obtain a permit or other approval/review (refer to Section 2.18 for additional detail).

The actions presented below describe the methods by which subsequent environmental review and other environmental compliance activities could be facilitated by SFPUC staff.

The management actions for environmental compliance provided in this section are divided into the following topics:

- Environmental Compliance Responsibilities
- Assessment Prior to New Activities/ Leases
- EIR Mitigation Measures
- Coordination and Collaboration

Environmental Compliance Responsibilities

Action env1 (Phase 1) Assign **environmental compliance duties** to an existing or new LRMS staff member. This staff member would oversee and facilitate all environmental compliance activities within the watershed. Primary responsibilities include:

A. Function as primary liaison to the SFPUC BERM, SPARC, and OER for review of all new projects/act as a clearinghouse for all new project applications.

B. Develop and administer a CEQA applicability checklist, in conjunction with BERM, SPARC, and OER, for use in all new projects within the watershed.

C. Oversee implementation of Mitigation Monitoring and Reporting Program (which will be prepared and adopted as part of the program-level EIR for this Plan).

D. Ensure that all conditions of Plan approval are incorporated into this Plan and implemented.

E. Act as primary liaison for LRMS with other regulatory agencies to ensure that the section stays abreast of applicable requirements and foster open communication and strong working relationships with such agencies and their staff.

F. As a result of interagency liaison efforts, develop and provide a permit/

"Implementation of individual projects and activities identified within the Plan may be subject to subsequent, project-level environmental review under CEQA."

approval checklist for internal SFPUC circulation and for private entities proposing projects within the watershed.

G. Develop and oversee a system designed to track internal compliance with environmental regulations, including maintaining copies of all active permits.

H. Staying current on and keeping appropriate staff informed of all applicable existing and new laws, rules, regulations, and listings by USFWS, CDFG, and other agencies.

I. Administer once annually a training seminar for all relevant SFPUC staff on current environmental compliance requirements and responsibilities.

J. Update sections of the Watershed Manual (Action saf12) that address environmental compliance mechanisms and responsibilities, as necessary.

Assessment Prior to New Activities/Leases

Action env2 (Phase A) Upon receiving a proposal for a new project or activity (as defined in Policy WA19) within the watershed, **review in coordination with BERM** and the review process for proposed plans and projects (Actions des1 and des2), to determine if such activity qualifies as a "project" as defined by CEQA. If the activity is subject to CEQA, work with OER to determine whether the environmental effects of such action were adequately analyzed in the program-level EIR or whether subsequent environmental review is needed.

Action env3 (Phase A) Require consultation with the LRMS environmental compliance staff member (see action env1) as a **condition of all new leases and renewals** granted within the watershed. The terms and requirements for consultation shall include, at a minimum, an initial meeting prior to issuance of the lease to determine specific lease requirements, and future permit/Plan requirements. Subsequent consultation will be required upon implementation of any new programs, construction, or activities that would alter the existing site.

Action env4 (Phase A) Require that SFPUC staff responsible for watershed activities (both ongoing operations and maintenance activities and new programs) **consult** and get assistance from the LRMS **environmental compliance** staff member prior to implementation.

EIR Mitigation Measures

Action env5 (Phase 1) Incorporate mitigation measures identified in the program-level Peninsula Watershed Management Plan EIR into a revised version of this Plan as appropriate (i.e., incorporate into relevant actions, create new actions, and/or modify existing actions).

Coordination and Collaboration

Action env6 (Phase A) Provide **comments** on **environmental documents** for any projects within the greater hydrologic watershed to ensure that potential adverse effects on the Peninsula

reservoirs and SFPUC lands are mitigated to the fullest extent. Guidelines include:

A. Designate an individual responsible for receipt, distribution, and response to planning initiatives in San Mateo County.

This page intentionally left blank.

5.15 Lease and Permit Requirements (lea)

Uses and activities, other than those undertaken by the SFPUC for normal watershed operation and maintenance, on SFPUC-owned lands require the execution of a lease and/or permit from the SFPUC. This provides the opportunity to ensure that uses and activities on SFPUC lands are conducted in an acceptable fashion, consistent with the actions presented in this chapter, as well as the goals and policies of this Plan. Public Access Permits allow for scientific, educational, agency, and group access and are administered by LRMS staff. Land Use Permits and Leases allow for specific ongoing activities on the watershed such as golf at the Crystal Springs Golf Course. These Land Use Permits and Leases are granted by the Bureau of Commercial Land Management. However, once Land Use Permits and Leases are granted, LRMS staff oversee the activities on the land.

The management actions for lease and permit requirements provided in this section are divided into the following topics:

- Public Access Permits
- Land Use Lease and Permit Requirements

Additional actions related to lease and permit requirements but more appropriately addressed in other sections include:

- periodic review of utility lessees emergency response plans (Section 5.8: Safety and Security);
- required assessment for natural and cultural resources prior to new activities (Section 5.9: Vegetation, Soil, and Pest Management; Section 5.10: Wildlife; Section 5.11: Aquatic Zone Protection; Section 5.13: Cultural Resources);
- IPM education for lessees (Section 5.9: Vegetation, Soil, and Pest Management);
- actions related to consultation with environmental compliance staff prior to lease issuance (Section 5.14: Environmental Compliance);
- training for docents/trail group leaders and staff to review proposed plans and projects for compatibility with watershed goals and policies (Section 5.17: Staffing and Training);
- assessment of lease and permit costs and benefits (Section 5.18: Fiscal Framework); and
- actions for the review of proposed plans and projects (Section 5.20: Design and Construction Requirements).

"Leases and permits provide the opportunity to ensure that uses and activities on SFPUC lands are conducted in an acceptable fashion, consistent with the goals and policies of this Plan."

Public Access Permits

Action lea1 (Phase 1) Develop a **Scientific, Educational, and Agency Permit Reservation System** to provide access for qualified research and educational

pursuits and assign access permit reservation duties (also Action lea2) to an existing or new LRMS staff member. Guidelines include:

A. Permit applications should be made either electronically, by telephone, or by mail.
B. Requests should identify the type of activity desired, the location, and duration of the activity.
C. The group requesting the permit must be a qualified non-profit organization, educational institution, or public agency.
D. Fees will be waived for qualified organizations.
E. The Scientific, Educational, and Agency Permit Reservation System should be coordinated with the Public Access Permit Reservation System (see Action lea2) so that electronic requests can be made.

Action lea2 (Phase 1) Develop and staff (in coordination with Action lea1) **a Watershed Information and Public Access Permit Reservation System** for all individual and group public access activities that is informative and easy to use. The system will:

A. Provide schedules and a reservation system for docent-led tours including meeting times, locations, routes, and fees.
B. Identify which docent-led tours are filled and which have available space.
C. Identify permit requirements for non-docent led access.
D. Identify fees and methods of payment for docent and non-docent led access. Fees will be set by the SFPUC and reviewed annually.
E. Identify which areas of the watershed are open and closed to the general public.
F. Identify trail closures and other regulations and restrictions.
G. The reservation system will be made readily accessible by providing access through the SFPUC's Internet website, telephone, and by mail.
H. The reservation system will be easily understandable through the application of user friendly software and instructions.
I. Allow for the electronic reservation and issuance of permits for trail access and watershed facilities.
J. Provide up-to-date watershed-related information via bulletins and announcements, which shall be revised on a regular basis.

Land Use Lease and Permit Requirements

Action lea3 (Phase 1) In coordination with the Bureau of Commercial Land Management and the review process for proposed plans and projects, **ensure that all new leases and easement agreements, as well as existing leases** when they come up for renewal, include: water quality protection measures, required BMPs, emergency response plans, monitoring programs, inspection privileges, water conservation measures, IPM policies and practices, and schedule of en-

forcement procedures and penalties. Direct the SFPUC to seek whatever authority necessary to enforce these regulations. The following elements should be included and implemented as part of amended, new, or renewed leases:

A. Require lessees to provide funds for ongoing water quality monitoring and any necessary remediation or alterations to their activity due to the results of monitoring.

B. Require the use of and adherence to all policies set forth in the Watershed Management Plan and the measures and mechanisms set forth in the Watershed Manual.

C. Require leases to provide storage, transfer, containment, maintenance, repair, and disposal procedures.

D. Require review and comment from SFPUC staff prior to application of hazardous chemicals.

E. Require maintenance/repair/replacement schedule for sanitation and waste treatment systems.

F. Require the development and implementation of an emergency response plan for various scenarios (i.e., earthquake, fire, hazardous materials spill, etc.) and state time elapsed between event and notification of SFPUC.

G. Develop and implement nutrient control BMPs to control and mitigate runoff before entering tributaries, and incorporate changes in leases. For example, create buffer strips and revegetate riparian corridors to maximize absorption and breakdown of fertilizers, particulates, organic compounds, etc.

H. Require implementation of water conservation techniques and recycled water. Install water meters and establish billing rates that encourage conservation.

I. Define contingency plans and enforcement penalties if disturbed soil is not stabilized before the onset of wet weather.

J. Require that all vehicles and equipment used by a lessee are serviced regularly.

K. Require that all vehicles are equipped with spark arrestors and that each vehicle carries fire suppression equipment.

Action lea4 (Phase 1B) In conjunction with the Water Quality Bureau, develop a **water quality protection and monitoring plan for each lease** to identify water quality improvements and to quantify potential water quality impacts of lease operations and permitted activities. Guidelines include:

A. Identify structural measures and improvements to improve water quality protection.

B. Establish responsibilities for (i.e., SFPUC or lessee) and a completion date for implementation of water quality improvements.

C. Monitoring shall be conducted by Water Quality Bureau staff or an independent lab.

D. Costs of monitoring and water quality analysis as well as any remediation required due to degraded water quality will be borne

by the lessee, as required by their lease.

E. Monitor surface water runoff at key stream and reservoir locations as well as groundwater quality monitoring, as necessary.

F. Monitoring will be conducted periodically at an interval determined to be appropriate for the activities being monitored.

Action lea5 (Phase A) Prior to approval of leases and permits requiring the use of pesticides, **review** the **CHAMP** prepared by the lessee or permitee, in coordination with the SFPUC IPMP and the LRMS IPM Program. The CHAMP should include, at a minimum, the following:

A. An analysis of available non-chemical alternatives for each pest management problem and rationale for proposed chemical and pesticides use.

B. A list of compounds proposed for use, including but not limited to: fertilizers, insecticides, fungicides, vermicides, rodenticides (e.g., for gopher control), and herbicides. Require submittal of the Pesticide Use Proposal forms described above for all compounds. Only approved compounds used at approved application rates will be allowed on leased properties.

C. A pre-determined set of criteria for compound application based on field conditions at the time of application to avoid excessive runoff or other application events.

D. A plan for large-scale control measures such as artificial wetlands, detention/recycling of runoff, and localized groundwater containment by pumping for irrigation needs, to ensure that delivery of constituents to local streams and reservoirs is minimized or eliminated.

E. A professionally designed spill contingency plan to prevent release of turf compounds during spills or upsets.

Action lea6 (Phase A) Prior to the approval of any lease or permit, conduct a **GIS database query** (Action inf4) to determine if any significant natural or cultural resources are present.

Action lea7 (Phase 1) Assign the duties of **lease coordinator** to an existing or new LRMS staff member responsible for overseeing Actions lea3, lea4, and lea5.

5.16 Public and Agency Outreach (pub)

Public and agency outreach is the mechanism by which the SFPUC can communicate relevant information and protection strategies for the watershed, as well as enhance inter-agency coordination on regional issues which affect the watershed. The actions presented below highlight the primary focus of this effort, and emphasize on- and off-site education, active community participation, coordination with relevant agencies and land owners, and the publication of rules and regulations related to prohibited and permitted uses.

The management actions for public and agency outreach provided in this section are divided into the following topics:

- Public Education Program
- Facilities and Information
- Docent Program
- Coordination and Collaboration

Additional actions related to public and agency outreach but more appropriately addressed in other sections include:

- actions to develop a watershed information and permit system (Section 5.15: Lease and Permit Requirements); and
- actions related to coordination and collaboration with other agencies and members of the public (Section 5.3: Hazardous Materials and Contaminants; Section 5.4: Waste - Human and Animal; Section 5.8: Safety and Security; Section 5.9: Vegetation, Soil, and Pest Management; Section 5.12: Fishery Resources; and Section 5.19: Information Management).

Public Involvement

Public Education Program

Action pub1 (Phase 1) Develop and implement an overall **Watershed Public Education Program** to implement the actions set forth in this action as well as other public education duties, as applicable.

Action pub2 (Phase 1) Designate an existing or new LRMS staff member with credentials in natural resources public education to assume the responsibilities of **implementing the overall public education program.** Responsibilities include:

- implementation of all public education plan actions;
- community program coordination;
- public agency coordination;
- public information development; and
- coordination of speakers and tours.

Facilities and Information

Action pub3 (Phase 1) Establish "gateway" information **kiosks** at major entryways to the watershed. Information at these facilities should include:

A. Visitor orientation and map of the area.

B. History, purpose, and rules and regulations pertaining to the watershed and its use.
C. Exhibits on the diverse features and resources located within the watershed.
D. Information that encourages visitors to visit the Watershed Visitor Education Center.
E. Importance of water quality protection and water conservation.
F. Information related to ongoing volunteer efforts on the watershed and how one can get involved (e.g., docent program, ecological restoration work, etc.).

Action pub4 (Phase 2) Establish a Watershed Visitor Education Center to provide and function as a gathering place for the discussion of topics such as water quality/supply concerns, water conservation, ecological resource studies, natural history field programs, etc. The facilities shall include but not be limited to providing the following:

A. Watershed area visitor information, including maps; brochures; and the purpose, history, and rules and regulations governing the use and management of the watershed.
B. Programs and measures to protect sensitive cultural and/or natural resources (to be required as a part of any effort to interpret such resources).
C. Increased awareness and appreciation of the outstanding diversity of natural, cultural, scenic, and recreational resources of the watershed, as well as the avoidable, unavoidable, and beneficial human interactions with the watershed. A variety of ways to enhance the visitor's experience in the watershed shall be considered, such as a working model of each watershed and audiovisual presentations.
D. Provide a full spectrum of barrier-free (e.g., physical, linguistic, cultural, sensory) interpretive opportunities.
E. Day-use opportunities, with an emphasis on preservation of the natural landscape, wildlife values, and interpretation of the area's cultural resources, should be provided at or adjacent to the education center. These might include an interpretive loop trail system highlighting the natural resources of the watershed, as well as wetlands restoration and other ongoing watershed management programs; picnic facilities; and an outdoor setting (e.g., amphitheater) for group discussions and lectures.
F. Information about the risks to water quality from the use of fertilizers, pesticides, herbicides, metals, hazardous materials, liquid propane or other fuels, cleansers and solvents, and other chemicals.
G. Information relating to fire, including risks, prevention, and the need for treatment.
H. Representative portions or components of non-operative historic water facilities and structures for use in historic displays, as appropriate.

Action pub5 (Phase 2) Develop a coordinated **graphics and signage program and** supporting **manual** for the watershed which includes the following types of signage:

- Identification signage is provided to name or "identify" public areas and facilities as well as watershed boundaries to the user.
- Directional signage "directs" the user to a particular destination or in a particular direction of travel.
- Regulatory signage is provided to identify permitted/prohibited uses, to warn users of possible hazards and inform visitors of other pertinent regulations.
- Interpretive signage explains or "interprets" information pertaining to a particular site feature or subject.

Guidelines include:

A. Establish a design compatibility between the four types of signage.

B. Determine the appropriate locations for each type of sign.

C. Signs associated with the use of a building(s) will be placed flat on the outside walls of building(s), not on roof(s).

D. All signs will meet the following standards: signs and associated support structures should be unobtrusive and should not significantly contrast with the surrounding setting; colors should blend with the setting while allowing for sufficient contrast of lettering needed to clearly communicate the intended message; backs of all signs should be unobtrusive, non-reflective, and blend in with the setting; internal illumination or backlighting is prohibited for all signs; and spot lighting of signs may be allowed where needed for safety.

E. The following signs are prohibited on the watershed: luminous signs or those with intermittent or flashing lights, exclusive of signs otherwise needed for warning or safety reasons (luminous signs include those signs that give forth their own light, or any transparent or translucent sign through which artificial light is emitted, including any neon sign, fluorescent sign, or advertising light display); billboards; signs that move or give the appearance of moving, exclusive of signs otherwise regulated for purposes of warning or safety; and portable or wheeled signs, or signs on parked vehicles where the sign is the primary use of the vehicle.

F. The following signs are allowed on the watershed following SFPUC review: signs required for ordinary repair, maintenance, and cleaning activities, provided no changes occur in size, structure, color, or message; one temporary construction site identification sign that is not greater than 32 square feet (removal must be accomplished upon project completion); temporary signs needed by public service/utility companies indicating danger and/or service and safety information (removal must be accomplished upon project comple-

"Public and agency outreach allows the SFPUC to communicate relevant information and protection strategies for the watershed and enhance inter-agency coordination on regional issues."

tion); signs warning the public against trespassing, danger from animals, the private nature of a road, driveway or premise, or signs prohibiting or otherwise controlling land use, provided such signs are not greater than two square feet; and signs posted by governmental jurisdictions giving notice to the public (such signs shall be no larger than that required to convey the intended message, and unless otherwise permitted or regulated, shall not exceed one square foot).

Action pub6 (Phase 1) Develop a **mobile watershed exhibit** to be displayed at popular (i.e., highly visited) Bay Area locations (e.g., the San Francisco Zoo, Golden Gate Park's Natural History Museum, the Exploratorium) and local schools in cooperation with appropriate staff from the City of San Francisco and other applicable agencies and groups. The exhibit shall address water quality protection, water conservation, watershed history, the watershed's natural and cultural resources, and management of the watershed.

Action pub7 (Phase 1) Develop a **public use areas map** to be distributed at watershed kiosks, the Watershed Visitor Education Center, and by docents. The map shall include but not be limited to:

A. Trails available for public access.
B. Trails available for docent-led access.
C. Public roads and parking areas.
D. Public facilities including restrooms and the Watershed Visitor and Education Center.
E. Watershed rules and regulations.

Action pub8 (Phase 1) Develop **brochures and displays** to be used at watershed kiosks and at the Watershed Visitor and Education Center. The brochures and displays shall include, but not be limited to, the following:

A. Highlight the importance of, and provide practical methods for, water quality protection and conservation.
B. Highlight watershed history and its ecological, cultural, and scenic resources.
C. Provide information relating to fire, including risks, prevention, and the need for treatment.
D. Provide information related to nontoxic alternatives and minimizing application of fertilizers, pesticides, herbicides, and other hazardous materials; erosion control from gardening, landscaping, construction, and maintenance procedures; conserving and enriching topsoil; organic lawn care and gardening practices; composting methods; water conservation techniques; and use of recycled water.

Action pub9 (Phase 1) Publish rules and regulations regarding prohibited and permitted uses, potential hazards, emergency numbers, water supply protection and risk minimization measures, and other safety and security issues in

SFPUC brochures, bulletins, water bill inserts, newsletters, and permit applications; post at all major trailheads.

Action pub10 (Phase 1A) Provide and periodically update select **watershed information** to the public and agencies (e.g., data and permit information) **using** SFPUC's Internet **website**.

Docent Program

Action pub11 (Phase 1) Develop a **docent program** coordinated with the Public Access Permit Reservation System (Action lea2) to allow individuals access to select areas of the watershed that are generally closed to public access. Guidelines for developing the docent program include:

A. The docent program will be administered by SFPUC, coordinated by the public education coordinator, and staffed by trained volunteers.
B. User fees shall be charged to individuals partaking in docent-led tours to cover SFPUC administration costs associated with the program and other related costs.
C. Docents will be routinely trained or retrained by SFPUC staff. Docents will be taught about trail locations, etiquette, and SFPUC's watershed rules and regulations.
D. Docents will conduct tours according to an established and publicized schedule and will be available at predetermined locations at assigned times to accommodate preregistered visitors and walk-up visitors. Tours will be limited to no more than 25 persons per tour.
E. Topics for docent-led tours should include the archeologic and historic heritage of the watershed, the historic development of water system facilities, water quality protection, water conservation and reclamation, sensitive natural resources, and fire prevention.

Coordination and Collaboration

Action pub12 (Phase A) Collaborate with appropriate agencies/groups (i.e., non-SFPUC groups managing land within the watershed) in the development of **educational materials.**

Action pub13 (Phase 1) Develop written **agreements with** public and private **landowners** outside of SFPUC-owned watershed lands to institute voluntary restrictions on land uses and activities that protect water quality.

Action pub14 (Phase A) Coordinate with other applicable agencies and organizations in the compilation and maintenance of **resource databases** to protect and manage watershed lands.

Action pub15 (Phase 2) Coordinate with Federal, State, regional, and local agencies on the development of watershed **educational displays and brochures**.

Action pub16 (Phase 1) Coordinate with **Bay Area schools and universi-**

ties to develop watershed-based curriculum and specific projects.

Action pub17 (Phase 3) Identify and implement watershed ecological **restoration projects** or monitoring studies as components of a watershed-based curriculum in applicable Bay Area schools and universities.

5.17 Staffing and Training (sta)

To adequately protect and enhance watershed resources, as well as to implement and enforce the actions set forth in this Plan, the SFPUC must have sufficient staff, resources, and appropriate training.

The management actions for staffing and training provided in this section are divided into the following topics:

- Staffing
- Enforcement Procedures Training
- Watershed Resource and Watershed Management Plan Training
- Fire Management and Emergency Response Training

Additional actions related to staffing and training but more appropriately addressed in other sections include:

- actions related to fire management activities and emergency response procedures to be conducted by SFPUC staff (Section 5.7: Fire Management).

Staffing

Action sta1 (Phase 1) Identify and **evaluate** all existing **LRMS staff responsibilities**, all LRMS responsibilities identified in this Plan, and all non-LRMS staff responsibilities that are watershed-related. Ensure that the number, type, and classification of staff positions are adequate to assume these responsibilities. Wherever possible, **assign responsibilities** to existing staff. Where necessary, hire new staff and/or create new positions to fill those responsibilities that cannot be met by existing staff. Outside contractors may be considered for selected short-term responsibilities. Staff responsibilities identified in this Plan include various assessment, management, operational, coordination, and monitoring activities as well as the following specific duties:

- Fire Management Plan implementation coordinator (Action fir13)
- Safety coordinator (Action saf3)
- Environmental compliance coordinator (Action env1)
- Permit reservation coordinator (Actions lea1 and lea2)
- Lease coordinator (Action lea6)
- Public education coordinator (Action pub2)
- Watershed natural resources center coordinator (Action inf1)
- GIS coordinator (Action inf2)
- Watershed web page coordinator (Action inf5)
- Proposed projects review coordinator (Action des3)

Action sta2 (Phase 1) Evaluate all watershed operations and maintenance activities and **establish standards for staff** and time allocations for each activity, which can then be applied to watershed operations and maintenance tasks. Prior to execution of specific operations and maintenance activities, de-

"To adequately protect and enhance watershed resources and implement and enforce the actions set forth in this Plan requires sufficient staff, resources, and appropriate training."

termine, based on these standards, appropriate staff and time allocations for the specific tasks. This information should be utilized as part of the Water Supply and Treatment Division work order system.

Action sta3 (Phase 1) Assign an LRMS **staff member to oversee watershed maintenance activities** not under the direct authority of LRMS staff (e.g., pipeline maintenance). This individual should be trained in the resources of the watershed to ensure adherence to BMPs and protection of the watershed's natural and cultural resources.

Action sta4 (Phase 1) Provide adequate staff to monitor legal watershed activities including public day use and hiking, as well as illegal activities such as vandalism, trespassing, and inappropriate disposal of waste.

Enforcement Procedures Training

Action sta5 (Phase 1) Provide **training for** watershed keepers and LRMS staff to attain **Peace Officer status.** Training should include enforcement and safety procedures and identification of activities that could directly or indirectly (e.g., vegetation damage) result in water quality degradation. Training should include an overview of basic water quality issues including the activities that can negatively affect water quality, sample collection procedures, and water quality monitoring methods.

Watershed Resource and Watershed Management Plan Training

Action sta6 (Phase 1) Conduct water quality and ecological resources training for LRMS staff, operations supervisors and crews, SFPUC and UEB engineers, and project managers to familiarize workers with the locations of High WQVZs and appropriate responses to ecological resources, particularly within the vicinity of high and moderate ESZs.

Action sta7 (Phase 1) Conduct training classes for watershed managers, watershed keepers, and crew supervisors on the management and protection of significant known and unknown **cultural resources**. Workers should be trained to identify potential locations of and appropriate practices within the vicinity of known significant cultural sites.

Action sta8 (Phase 1) Provide mandatory training for all appropriate SFPUC staff to become familiar with **this Watershed Management Plan** and the procedures required to carry out their particular duties.

Action sta9 (Phase 1) Train selected staff and docents **to provide meaningful interpretation** of watershed resources and to assist with community outreach to schools and interest groups.

Fire Management and Emergency Response Training

Action sta10 (Phase 1) Provide fire-related training to selected staff members. Include as part of the training the following:

A. Incident Command System training courses.
B. Suppression skills.
C. Landowner/decision-maker roles in fire suppression.
D. Preparation and execution of prescribed burns.
E. Plant identification and ecology of local species.

Action sta11 (Phase 1) Establish an **employee training** program **for safety and emergency response** procedures, coordinated with emergency response drills (Action saf8). 🏛

This page intentionally left blank.

5.18 Fiscal Framework (fic)

Adequate funding is crucial to the implementation of watershed maintenance and monitoring activities by the SFPUC, and therefore critical to the long-term viability of the watershed as a feasible and high quality water supply source. The actions presented in this section focus not only on funding sources, but on the costs and subsequent benefits of existing and future activities, as well as potential opportunities for the SFPUC to purchase lands and easements within the greater watershed that are currently owned by entities other than the SFPUC. Actions pertaining to the fiscal evaluation of existing and future operations and maintenance are intended to yield new opportunities for cost savings and/or increased efficiency for the continued implementation of these important management strategies.

The management actions for fiscal framework provided in this section are divided into the following topics:

- Costs and Benefits of Watershed Activities
- Lease and Permit Fees
- Watershed Management Funding
- Funding Sources
- Acquisition of Watershed Lands
- Fines

Additional actions related to the fiscal framework but more appropriately addressed in other sections include:

- staffing and training needs (Section 5.17: Staffing and Training).

Costs and Benefits of Watershed Activities

Action fic1 (Phase A) Evaluate costs and benefits related to leasing, permitting, and public access activities on the watershed prior to allowing these activities to occur. The evaluation should include:

A. Direct costs of administration and management, including: staffing commitment, staff training, equipment and supplies, infrastructure and facilities, physical improvements to the land, provision of water, and other "soft" resources.

B. Indirect costs from these activities, including: adverse impacts to water quality/supply, ecological resources, cultural resources, scenic quality, and recreation. These costs can be somewhat difficult to quantify; however, one method is to assess the monetary costs of remediation and protection, including: additional water treatment, erosion control, fire control, and monitoring activities.

C. Direct benefits from generated revenues.

D. Indirect benefits, including: beneficial physical improvements to the land (e.g., new/expanded wetlands, weed control), fire management/

"Adequate funding is crucial to the implementation of watershed maintenance and monitoring activities and therefore critical to the long-term viability of the watershed as a high quality water supply source."

control, public goodwill, and expanded information and knowledge of watershed resources.

Action fic2 (Phase A) Continue/authorize or modify/prohibit specific **lease and/or permit activities** based on the results of the lease/permit cost and benefit analysis (fic1). Guidelines include:

A. Continue existing activities and allow new activities that: (1) produce insignificant impacts to water quality, water supply generated by the watershed, and watershed natural resources; and (2) provide more revenue than they cost to administer and manage or revenue can be raised to this level.

B. Modify existing activities and prohibit new activities that are found through this analysis to have significant adverse effects to water quality, water supply, and watershed resources, regardless of the amount of revenue generated; or cost more to manage and administer than is provided by the generated revenue.

Lease and Permit Fees

Action fic3 (Phase A) Calculate the **appropriate charges** for lease activities and permit fees using the cost/benefit analysis method discussed under Action fic1; a comparison with fees paid in the private sector for similar uses; and the judgement of SFPUC staff most familiar with the activity.

Action fic4 (Phase A) Modify existing leases and permit fees, and set future lease and permit fees based on the calculations from Action fic3.

Watershed Management Funding

Action fic5 (Phase 1A) Target funds for watershed management activities and staff positions according to the following guidelines:

A. The priorities for watershed activities, staffing, and training set forth in this Plan.

B. The amount of available funding.

C. The ability to provide the appropriate level of funding needed to carry out the applicable task.

Action fic6 (Phase A) Evaluate the **costs and benefits** associated with specific watershed management activities and tasks **prior to authorization** of funds.

Funding Sources

Action fic7 (Phase 1B) Evaluate alternative sources of **funding and implementation** methods for watershed management and monitoring and public use activities on the watershed.

A. Potential partners and/or sources of funding for both watershed management and monitoring activities and/or public recreation activities include: Federal and State agencies including but not limited to the EPA, California State Parks and Recreation Department, and CDFG; San

Mateo County; GGNRA; schools and universities; CNPS; Audubon Society; and the Sierra Club.

B. Potential sources of funding for public use activities include: (1) charging user fees, (2) establishing a Watershed Trust Fund, and (3) starting a "Friends of the Watershed" group.

C. An alternative implementation method is to train volunteers for various activities, including: (1) docent-led tours, (2) trail and general watershed maintenance, (3) watershed security, and (4) simple monitoring activities.

Acquisition of Watershed Lands

Action fic8 (Phase 1) Evaluate and rank all **lands** within the hydrologic watershed but outside of SFPUC's landholdings **for potential outright purchase or easement** of these lands. Guidelines for the ranking system include:

A. Priority 1: These lands play a major role in water quality and/or continued water supply and are likely to be developed and/or adversely affect water quality. These lands are generally located in High WQVZs. Formulate aggressive measures to purchase Priority 1 lands outright or purchase conservation easements.

B. Priority 2: These lands have a significant overall role in the health of the watershed or facilitate better and more effective management of the watershed. These lands are generally located within Moderate WQVZs or high ecological, fire, or landslide sensitivity zones. Formulate measures to purchase Priority 2 lands outright or purchase conservation easements after Priority 1 lands/easements have been purchased or when available, and if practical.

C. Priority 3: These lands have a secondary overall role in the health of the watershed and/or facilitate better and more effective management of the watershed. These lands are generally located in Low WQVZs or moderate ecological, fire, or landslide sensitive zones. Purchase Priority 3 lands outright or purchase conservation easements only after Priority 1 and Priority 2 lands/easements have been purchased or when available, and if practical.

D. Priority 4: Do not purchase land or protection/conservation easements on lands that have only a minor role in the health of the watershed, or are otherwise unavailable.

Action fic9 (Phase 1A) Coordinate with upstream land owners to develop and place a **natural and cultural resources conservation easement** over non-SFPUC owned watershed lands in coordination with CDFG, San Mateo County, and other agencies, as applicable to protect the watershed from future development and activities which may endanger the SFPUC's ability to protect water quality. This easement shall be in keeping with the policies and actions of this Plan and should stipulate that the

watershed be maintained substantially in its natural state and devoted to the collection, storage, and transmission of water and protection of water quality for human consumption, which is compatible with preserving the watershed in its present state as open space land.

Fines

Action fic10 (Phase 1) In coordination with the Bureau of Commercial Land Management, develop and implement a **schedule of fines** and/or penalties for failure to meet lease requirements which are related to water quality and/or resource protection.

5.19 Information Management (inf)

The internal maintenance of information as well as its dissemination to the general public, relevant agencies, and inter-SFPUC communication are important parts of effective watershed management. Information related to the location of sensitive species, fault zones, areas of slope instability, water quality data, cultural resources, and corresponding restrictions for use and/or required maintenance activities should be managed in such a way to be feasible, easily retrievable, and as efficient as possible. The actions presented below are focused on achieving this for external and internal (i.e., SFPUC) transmission of information.

The management actions for information management provided in this section are divided into the following topics:

- Watershed Natural Resources Center
- GIS Operations and Database Maintenance
- Coordination and Collaboration

Additional actions related to information management but more appropriately addressed in other sections include:

- actions related to regional coordination of resource databases (Section 5.16: Public and Agency Outreach); and
- actions related to data generated as a result of ongoing monitoring and survey efforts and actions related to querying the GIS database regarding resource sensitivity prior to new activities (Section 5.9: Vegetation, Soil, and Pest Management; Section 5.10: Wildlife; Section 5.11: Aquatic Zone Protection; Section 5.12: Fishery Resources; and Section 5.13: Cultural Resources).

GIS operations

"The internal maintenance of information and its dissemination to the public, agencies, and SFPUC divisions are important parts of effective watershed management."

Watershed Natural Resources Center

Action inf1 (Phase 2) Establish and staff a Watershed Natural Resources Center for use by SFPUC staff and other interested individuals and groups to house information (e.g., applicable documents, surveys, reports, and studies) pertaining to both the Alameda and Peninsula Watersheds. Guidelines include:

A. Appoint a resource center librarian responsible for coordinating the materials available at the center.

B. Locate the center in a central location (e.g., Millbrae headquarters).

C. Develop and make available standard procedures that allow staff, researchers, docents, and volunteers the opportunity to provide information to be maintained at the Watershed Natural Resources Center.

GIS Operations and Database Maintenance

Action inf2 (Phase 1) Assign GIS database operations and maintenance **duties** to a qualified GIS technician re-

sponsible for all resource updates and queries.

Action inf3 (Phase A) As new natural, cultural, and other resource data and findings become known, enter data into the **SFPUC GIS database** using standard entries for data source, ID code, type, name, date, status, description, and sensitivity. Information to be updated includes:

A. Fault zones.
B. Seismic hazards.
C. Slope stability.
D. Archeologic and historic sites and features.
E. Water quality data and monitoring.
F. Sensitive, rare, threatened, and endangered species and habitat data.
G. Fisheries information.
H. Vegetation.
I. Vegetation management activities (action veg1).

Action inf4 (Phase A) Prior to any operations and maintenance and/or construction activities, **request a database check** from the watershed GIS technician for any known sensitive ecological or cultural resources or areas within the vicinity of the proposed activity.

Watershed Web Page Maintenance

Action inf5 (Phase 1) Assign the duties of maintaining and updating the watershed web page to an LRMS staff member trained in **web page maintenance**.

Coordination and Collaboration

Action inf6 (Phase A) Disseminate and acquire all significant information (GIS and otherwise) to and from applicable agencies and local and regional databases (e.g., California Natural Diversity Database [CNDDB]). 🏛

5.20 Design and Construction Requirements (des)

All new construction activities within the watershed have the potential to degrade water quality and quantity, disturb ecological and cultural resources, and affect the scenic or historic value of the surroundings. The actions presented below set forth requirements for the design and construction of any new facilities and the modification of existing facilities, and are intended to minimize and avoid wherever possible these potential effects.

The management actions for design and construction requirements provided in this section are divided into the following topics:

- Review Process for Proposed Plans and Projects
- Construction Fencing
- Design Guidelines
- Accessibility Compliance

Additional actions related to design and construction requirements but more appropriately addressed in other sections include:

- actions related to easements prior to new activities to ensure that watershed resources will not be harmed by new activities or construction (Section 5.9: Vegetation, Soil, and Pest Management; Section 5.10: Wildlife; Section 5.11: Aquatic Zone Protection; Section 5.12: Fishery Resources; and Section 5.13: Cultural Resources);
- actions related to signage guidelines (Section 5.16: Public and Agency Outreach).;
- staff to review proposed plans and projects for compatibility with watershed goals and policies (Section 5.17: Staffing and Training); and
- GIS database query for sensitive resources prior to new construction (Section 5.19: Information Management).

"Construction activities within the watershed have the potential to degrade water quality and quantity, disturb ecological and cultural resources, and affect the scenic or historic value of the surroundings."

Review Process for Proposed Plans and Projects

Action des1 (Phase 1A) When a proposed plan or project is first presented to the SFPUC for consideration, prior to its detailed design or development, the Proposed Projects Review Coordinator (Action des3) staff should meet with the project proponent and identify for them the **requirements of the Watershed Management Plan** which must be met by that project or plan. LRMS staff may also develop specific criteria, as necessary, for project performance.

Action des2 (Phase 1A) To determine whether or not a proposed plan or project is compatible with the Watershed Management Plan goals and policies, all proposed plans and projects must be evaluated as part of the Review Process for Proposed Plans and Projects (see Figure 4-1) using the **Watershed Goals and Policies Compliance Checklist**. A

sample checklist is included in Figure 5-1. LRMS staff will be responsible for completing the checklist and making recommendations to the SFPUC. The SFPUC will be responsible for making both a preliminary and final determination as to whether a particular plan or project is compatible with the goals and policies of the Watershed Management Plan.

The preliminary review should involve development of conceptual plans, providing enough detail for the LRMS staff to make a recommendation to the SFPUC as to whether the project should proceed to the detailed design phase.

The final review should include the detailed plans outlined below to provide sufficient detail for LRMS staff to recommend to the SFPUC as to whether the project should proceed through the environmental review process. The project proponent must provide all applicable plans to the SFPUC so that the final review can be conducted. Plans should include, at a minimum and as applicable, the following:

A. A map of the site, at a scale of 1 inch = 500 feet or greater with 5-foot contour intervals or greater, showing pre-development land grades and final land grades; all structures and site improvements as applicable;
B. Elevation drawings of the site showing pre- and post-development appearance;
C. Descriptions of the proposed use;
D. Description of the drainage/erosion control features to be employed;
E. A landscaping plan, indicating the species, number, size, and location of plantings, as well as a description of irrigation provisions or other measures necessary to ensure the survival of plantings; and
F. Other plans as required by SFPUC staff.

Action des3 (Phase 1) Assign an LRMS staff member to be the **Proposed Projects Review Coordinator** to oversee the Review Process of Proposed Plans and Projects as set forth in Policy WA19 and Action des2.

Construction Fencing

Action des4 (Phase A) Prior to the initiation of any new construction or renovation/alteration of existing facilities or structures, **construct permanent perimeter fencing,** using metal posts with orange snow fencing for visibility, around the entire construction zone to enclose all construction-related activities and protect natural and cultural resources outside the zone from damage. In addition, any sensitive resources within the fenced construction zone or adjacent to the transportation corridors leading to the fenced construction zone shall be enclosed with similar fencing. Locations or sensitive species enclosures shall be identified by LRMS staff.

Design Guidelines

Action des5 (Phase A) Prior to approval of new construction activities or renovation/alteration of existing facili-

Project				● Sure	
Staff Reviewer		Date:		○ Unsure	
Watershed Management *Goal* or Policy	Exceeds	Consistent	Not Consistent	NA	Remarks
Water Quality					
Goal: Maintain and Improve Source Water Quality to Protect Public Health and Safety	○	●			
WQ1 Prevent the introduction of pesticides, herbicides, and rodenticides into the water supply by minimizing and controlling the use of these constituents, and implementing alternative …..		○			
WQ2 …….		●			
WQ3 …….					
Water Supply (WS)					
Goal: Maximize Water Supply			○		
WS1 Maximize reservoir storage capacities by minimizing sedimentation in reservoirs.			○		
WS2…….			○		
Vegetation (V)					
Goal: Preserve and Enhance the Ecological and Cultural Resources of the Watershed	●				
V1 Manage an IPM program to restrict and, where possible, eliminate the use of chemical applications….	●				
V2 …….	●				
Wildlife (W)					
Goal: Preserve and enhance the Natural and Cultural Resources of the Watershed.	●				
W1 Protect high Ecological Sensitivity Zones (ESZs), including host plant communities supporting populations of State and Federally listed animals, using sound scientific methods.	●				
W2 ……		●			
Aquatic Resources (AR)					
Goal: Preserve and enhance the Natural and Cultural Resources of the Watershed.			●		
AR1 Conserve, protect, and enhance the biodiversity, genetic integrity, and habitat of the watersheds aquatic resources.		○			

Figure 5-1: Sample Watershed Goals and Policies Compliance Checklist

ties, structures, or roads, ensure that the following **design guidelines** are met:

A. Where grading is necessary, slopes and landforms shall be contoured to mimic the surrounding environment as much as possible.

B. Design and site new roads and trails to minimize grading and the visibility of cut banks and fill slopes.

C. Overpasses, safety and directional signs, and other road and highway structures may protrude above a skyline only when it can be demonstrated that: the facility is necessary for public service and safety, the break in the skyline is seen only in the foreground, and the break in the skyline is at a minimum necessary to provide the required service.

D. Incorporate architectural siting/design elements that are compatible with the applicable surroundings (i.e., style, scale, form, texture, color).

E. Eliminate, wherever possible, the use of unpainted metallic surfaces and other sources that may cause increased levels of reflectivity.

F. Exterior lighting shall be directed downward and sighted and shielded such that it is not highly visible or obtrusive.

G. The silhouette of new structures shall remain below the skyline of bluffs, cliffs or ridges.

H. Design any new structural additions to historic structures to harmonize with older structural features and comply with scenic easements and aesthetic guidelines.

I. Encourage the salvage and selective re-use of building features if historic structures are demolished.

Accessibility Compliance

Action des6 (Phase A) Prior to the design and construction of new facilities and trails, ensure **compliance with all legally mandated accessibility standards.**

Action des7 (Phase 1) Establish a universal access program to address to all watershed facilities and trails by undertaking the following actions:

A. Train an appropriate number of SFPUC employees that strive to achieve and maintain barrier free accessibility at SFPUC facilities and areas open for public use.

B. Perform an accessibility review of all existing trails, facilities, and programs for compliance with legally mandated accessibility standards.

C. Establish priorities to bring existing trails, facilities, and programs into compliance with legally mandated accessibility standards.

D. Require and design all new trails and facilities to comply with legally mandated accessibility standards.

Action des8 (Phase 2) Using the priorities established in Action des7 (above), implement **universal access improvements** at SFPUC facilities and trails.

5.21 Southern Peninsula Watershed Golf Course (gol)

A golf course was first considered as a potential use on the southern watershed in a document prepared for the San Francisco Water Department entitled "Preservation and Recreation Concepts - Peninsula and Alameda - Santa Clara County Watershed Lands" by Wilsey & Ham/Metcalf and Eddy, 1968. This document forms the basis for permitted recreational activities in the Scenic and Recreation Easement and was attached as an exhibit to the easement documentation. The 1969 Scenic and Recreation Easement permits the construction of a golf course on the Southern Peninsula Watershed site.

In the early 1980s a golf course was again proposed in the vicinity of the Southern Peninsula Watershed at Edgewood Park, located south and east of the Southern Peninsula Watershed site. During hearings on the Draft Master Plan for Edgewood Park in 1983, several local environmental groups suggested that San Mateo County reconsider the development of a golf course at the Edgewood Park site since it could have adverse impacts on a rare butterfly and several rare plants. The environmental groups suggested, instead, that the County consider a site across the I-280 freeway in the southern watershed. In 1989, the County commissioned Thomas Reid Associates of Palo Alto to prepare a constraints analysis on the Southern Peninsula Watershed Site.

In 1990, the Sierra Club and other environmental groups raised concerns about using the watershed site for a golf course due to the potential impacts to biological resources. At this time the San Francisco Board of Supervisors urged the SFPUC to prepare comprehensive watershed management plans for its two urban watersheds.

Southern Peninsula Watershed Golf Course Site

In January 1995, the SFPUC adopted the Watershed Management Preferred Alternative for the Peninsula and Alameda Watersheds. The Preferred Alternative was based upon studies of the watersheds, their resources, and the sensitivity and vulnerability of these resources. The Preferred Alternative was based on the primary watershed management goal of maintaining and improving source water quality to protect public health and safety. The Watershed Management Preferred Alternative as approved in 1995 called for retention of existing golf courses, consideration of golf course expansion in areas of low sensitivity and vulnerability, and no new golf courses.

On March 4, 1997 a public hearing was held by the SFPUC to consider revisions to the Preferred Alternative. After extensive discussion and review of citizen testimony, the SFPUC revised the Preferred Alternative to consider a golf course on the Southern Peninsula Watershed.

The proposed location of the Southern Peninsula Golf Course is illustrated in Figure 5-2.

The Southern Peninsula Watershed Golf Course Element was prepared and is included in Appendix A-2. This Element provides more information on the golf course and San Mateo County's proposal.

The following actions for the Southern Peninsula Watershed Golf Course provide guidance for SFPUC staff regarding the activities to undertake should the design of a golf course proceed on the Peninsula Watershed. The management actions for the Southern Peninsula Watershed Golf Course provided in this section are divided into the following topics:

- Water Quality Protection
- Pest Management
- Southern Peninsula Golf Course Oversight Committee
- Natural Resource Studies and Monitoring

Water Quality Protection

Action gol1 (Phase A) Develop and implement **new practices to prevent water quality degradation** due to golf course operations and maintenance.

Action gol2 (Phase A) Develop a comprehensive groundwater and surface **water monitoring program** which provides for establishment of a water quality baseline as well as periodic ongoing monitoring and considers, at a minimum, the following potential contaminant contributors:

- Contaminants from roads and parking areas
- Construction and maintenance related erosion and contaminants
- Leaks from sewage/waste collection systems
- Increased runoff velocities
- Fate of biocides and fertilizers

Pest Management

Action gol3 (Phase A) Develop, implement, and periodically update an **IPM Program** in conjunction with the City and County of San Francisco's Pesticide Ordinance.

Southern Peninsula Golf Course Oversight Committee

Action gol4 (Phase 1B) Convene, on a regular basis, the **Southern Peninsula Golf Course Oversight Committee**. In reviewing preliminary and final plans for the golf course as well as monitoring the ongoing operations and maintenance of the golf course, the Committee should ensure that the water quality, water supply, ecological resource, and safety policies of the SFPUC are incorporated into the golf course plans and followed in its management.

Natural Resource Studies and Monitoring

Action gol5 (Phase 1A) As part of the project-level environmental studies, con-

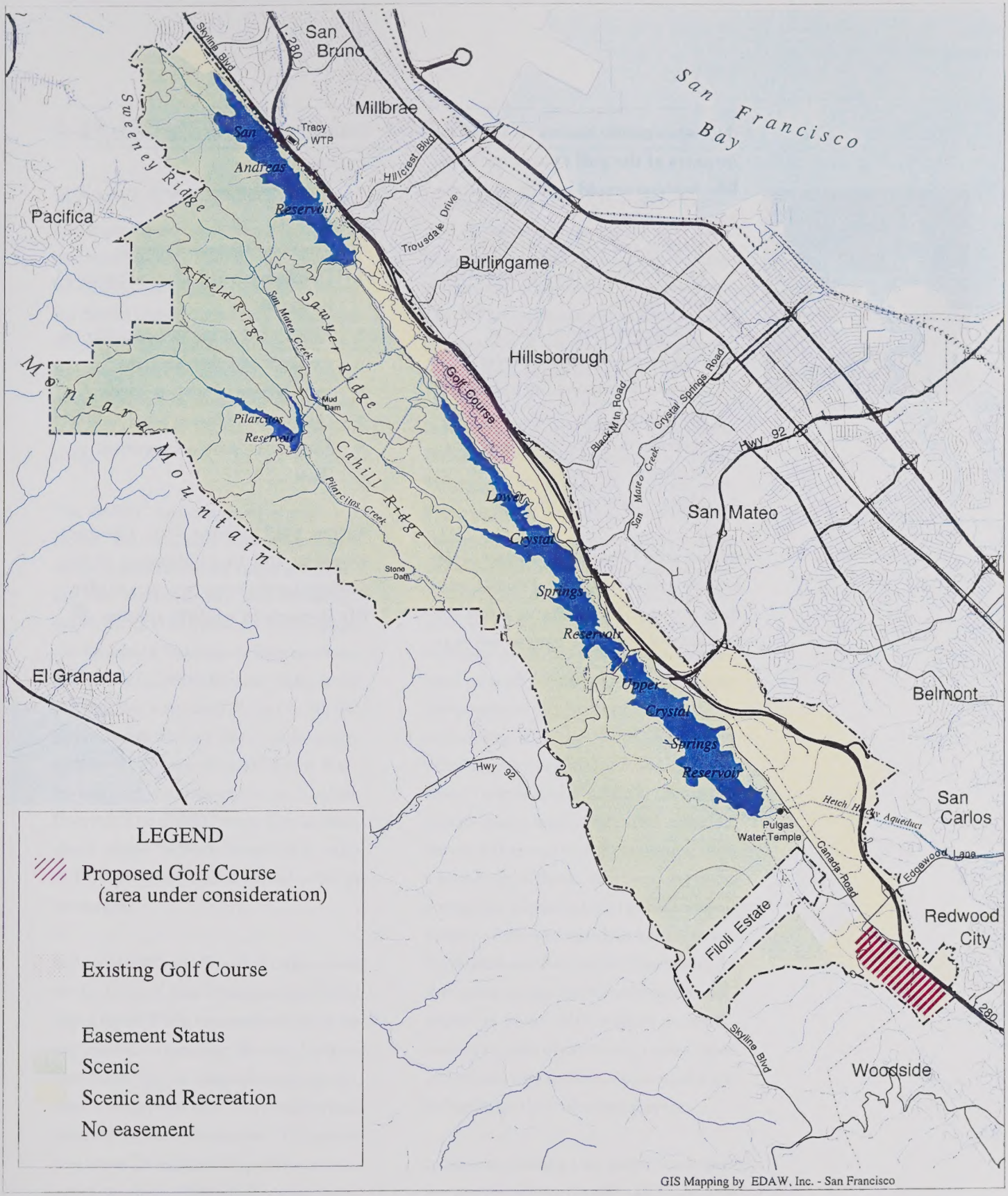


Figure 5-2 *Proposed Southern Peninsula Watershed Golf Course Location*

duct site-specific studies to assess the **impacts of the golf course on wildlife**. Analyses should include, at a minimum:

- Habitat and rare species studies
- Identification of the presence of sensitive species
- Change/reduction of habitat
- Non-target effects of biocides
- Human disturbance on boarders of golf course
- Increase in exotic predators (e.g., bullfrogs, rats, etc.)
- Migration patterns/changes

Action gol6 (Phase 1A) As part of the project-level environmental studies, conduct site-specific studies to assess the **impacts of the golf course on vegetation**. Analyses should include, at a minimum:

- Plant community and rare plant studies.
- Presence of sensitive species.
- Development in Ecological Sensitivity Zones.
- Effect of changes in hydrology on wetlands and riparian areas
- Introduction of noxious weeds
- Non-target effects of weed control
- Alternative pest management options

Action gol7 (Phase 2B) Conduct trapping and tissue sampling of two predator species every two years **to identify impacts to wildlife species**.

5.22 Fifield/Cahill Ridge Trail (tra)

The SFPUC's Peninsula Watershed has long been closed to public access to protect water quality and the drinking water supply of 2.3 million people. However, the SFPUC has always had provisions to allow access to groups, with a permit and a guide, to hike along the internal roads of the watershed. Access by permit has also always been allowed for scientific study.

The BARTC has proposed a multi-use (hiker, bicycle, and equestrian) trail which extends along the ridges surrounding San Francisco Bay and has designated, on its trail maps, a route through the Peninsula Watershed. This route extends from GGNRA's Sweeny Ridge south through the watershed along the Fifield/ Cahill Ridge Service Road to the intersection of Highway 92 and Skyline Boulevard (or alternatively to Skyline Quarry). The BARTC route then extends south along Skyline Boulevard, exits SFPUC property and continues to Kings Mountain.

In August 1991 the Board of Supervisors of the City of San Francisco (SFBOS) urged the SFPUC, by resolution, to defer any decisions regarding the use of watershed lands until a comprehensive watershed management plan was prepared and adopted by the commission. The action was made in response to public concern over a pending commission action to authorize the consideration of a new golf course at the Southern Peninsula Watershed. It was also prompted by other public issues and concerns over the location of trails and other uses of the watershed. The SFPUC subsequently authorized the preparation of watershed management plans, which began in August 1992.

Fifield/Cahill Ridge

In January 1995, the SFPUC identified a Preferred Alternative upon which Draft Watershed Management Policies and Plans would be prepared. The Preferred Alternative was based upon studies of the watersheds, their resources and the sensitivity, and vulnerability of these resources. The Preferred Alternative addresses watershed practices and operations as well as public uses. The trails component of the Preferred Alternative, in keeping with the Scenic Easement which does not provide public access, prohibited unrestricted public access to internal roads and trails and allowed docent led access to internal trails, with a permit. In addition, north-south public access was allowed along the eastern periphery of the watershed, in keeping with the Scenic and Recreation Easement. At the same time, the Commission also stated its policy with respect to the financial burden of providing recreational activities—that such activities would not be borne by the water rate payers.

In the intervening two years since, numerous inquiries, requests, and concerns have been raised with respect to trails on

the Peninsula Watershed. On March 4, 1997 the SFPUC reaffirmed its original position, with respect to trails, which prohibited unsupervised public access into the interior areas of the watersheds (PUC Res. No. 97-0070). Subsequently, on April 21, 1997 the SFBOS, based upon requests from the BARTC, recommended that the SFPUC reconsider the Bay Area Ridge Trail route through the interior of the Peninsula Watershed (SFBOS Res. No. 191-97-001). The SFPUC, on June 10, 1997 (Resolution 97-0177) amended the Preferred Alternative to consider public access to the Fifield/Cahill Ridge Service Road.

Based on the SFPUC resolution, the BARTC proposal is included in the following discussion as Alternatives A and B. **Alternative A: Unrestricted Access with Termination at Highway 92/ Skyline Boulevard** allows unrestricted hiker, equestrian, and bicycle access along the Fifield/Cahill Ridge Service Road between Portola Gate and the Highway 92/ Skyline Boulevard intersection. **Alternative B: Unrestricted Access with Termination at Skyline Quarry** allows unrestricted hiker, equestrian, and bicycle access along the Fifield/Cahill Ridge Service Road between Portola Gate and Skyline Quarry.

Alternative C: Access by Annual Permit is based upon the permit program of the East Bay Municipal Utility District (EBMUD) and provides unlimited access to the Fifield/Cahill Ridge Service Road for hikers who hold an individual annual permit. **Alternative D: Docent-Led Access** is based upon the original SFPUC Preferred Alternative (January 1995) and provides for docent-led access for hikers by reservation. Under Alternatives C and D, equestrians and bicycles would be routed to the existing trails along the eastern edge of the watershed via a new 0.6-mile connector trail. The latter two alignments extend from Portola Gate in the north to Skyline Quarry in the south. Figure 5-3 illustrates the four alternative alignments.

The No Project Alternative provides access to the existing trail system as well as docent-led access to the interior of the watershed.

The BARTC, in their efforts to extend a trail on the ridges surrounding the Bay, also have indicated a desire to extend the trail south, along an as yet undefined route which extends south from Highway 92 to King's Mountain generally following the alignment of Skyline Boulevard. This route is proposed to be included only with Alternatives A and B and is therefore termed **Alternative A/ B: Programmatic Skyline Boulevard Alignment**. Because this route is not as clearly defined as the Fifield/Cahill Ridge Trail, it will be addressed in the Peninsula Watershed Management Plan EIR, not at the project-level as the Fifield/ Cahill Ridge routes will be, but at a programmatic level, similar to the other policies and actions included in the Plan. The Fifield/Cahill Ridge Trail is unique in that it is the only site-specific project

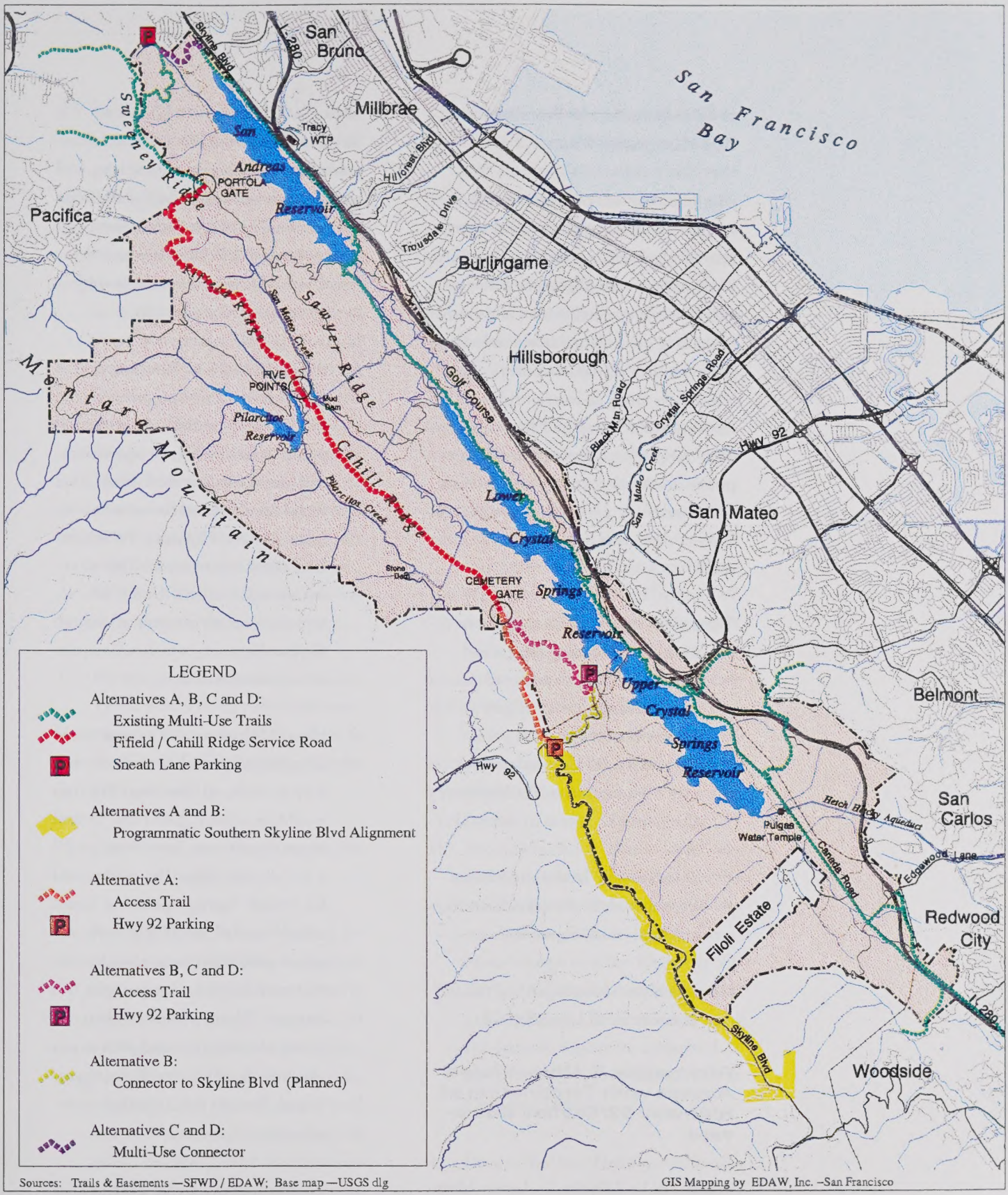


Figure 5-3 **Alternative Fifield / Cahill Ridge Trail Alignments**

Original Scale 1 : 24,000

to be included in the Peninsula Watershed Management Plan.

The following sections describe the four project level alternatives. A brief description of Alternative A/B: Programmatic Skyline Boulevard Alignment is also provided. In general, the four alternative projects allow trail use along an existing fire road, the Fifield/Cahill Service Road, which runs along an interior ridge within the Peninsula Watershed for 9.5 miles. The four project alternatives all achieve public access along this route. The service road runs generally from Portola Gate in the north to Highway 92 in the south.

The actions in this section have been divided into the following categories:

- Alternative A: Unrestricted Access with Termination at Highway 92/ Skyline Boulevard.
- Alternative B: Unrestricted Access with Termination at Skyline Quarry
- Alternative C: Access by Annual Permit
- Alternative D: Docent Led Access
- Alternative A/B: Programmatic Skyline Boulevard Alignment

For more information regarding this subject, please refer to Appendix A-3.

Alternative A: Unrestricted Access with Termination at Highway 92/Skyline Boulevard

Action tra1a (Phase 1) Under **Alternative A - Unrestricted Public Access with Termination at Highway 92/ Skyline Boulevard** provide unrestricted public access for hikers, equestrians, and bicyclists along the Fifield/Cahill Ridge Service Road between Portola Gate and the Highway 92/Skyline Boulevard intersection. This project would be subject to the following requirements:

A. Project Overview: Alternative A is the preferred route proposed by the BARTC and includes unrestricted public access for hikers, equestrians, and bicyclists along the Fifield/Cahill Ridge Service Road between Portola Gate and the Highway 92/Skyline Boulevard intersection. This alternative is 9.5 miles. Under this alternative, access is required through Skyline Cemetery which will require an access easement.

B. Hours of Operation: The trail would be open seven days a week, from 8 a.m. to dusk, all year long. The trail would be closed, gated and locked seven days a week from dusk until 8 a.m. all year long. The trail would be closed during operating hours only if needed for SFWD work, resource protection, habitat migration, storm damage and repair, or fire danger. Where possible, advanced notice would be provided prior to any closures, except in the case of operational, fire, or public safety emergencies.

C. Usage: Alternative A would allow hikers to have independent access

during operating hours, on a permanent basis. Bicyclists and equestrians will have independent access during operating hours subject to an annual review of bicycle and equestrian access. If violations of watershed rules and regulations are found to occur consistently by either of these two groups, their privilege of access will be revoked and access rerouted to the eastern edge of the watershed via San Andreas, Sawyer Camp, Crystal Springs and Canada Trails. Alternative A sets no limit on number of users per day. There would be no motorized access except for official authorized vehicles (i.e., SFPUC, CDF, emergency, and law enforcement vehicles).

D. Permit and Reservation System: There would be no permit or reservation system required for access to the Fifield/Cahill Ridge Trail under Alternative A.

E. Fees: There would be no access fees under Alternative A.

F. Parking/Access: Primary parking for Alternative A would be located on the unimproved CalTrans property on the north side of the intersection of Highway 92 and Skyline Boulevard (Figure 5-3). Pedestrians, bicyclists, and equestrians would proceed from this property along the main cemetery road for approximately 1/8 of a mile, then turn right on the first, smaller paved road. The trail follows this paved road until the first fork, then turns right on the narrow, dirt road and follows this route as it winds up to the southern gate of the Watershed. This would also be the location of the primary trailhead for this alternative. Secondary access and a trailhead would be located at Portola Gate with parking at Sneath Lane.

G. Restroom Facilities: Five permanent restrooms would be located along the trail. One each at Sneath Lane; approximately ¼ mile south of Portola Gate; at Five Points; midway between Five Points and Cemetery Gate; and at the Highway 92 parking area. Each restroom would be, at a minimum, one chemical toilet with a large (approximately 1,000 gallon) vault below. The restrooms would need to be pumped approximately once a week, depending on usage.

H. Support Facilities: Three water fountains and three public telephones would be co-located with the restroom areas at the trailheads at Sneath Lane and the Highway 92/ Skyline Boulevard intersection and at Five-Points. Three water troughs for horses would be required at Sneath Lane, at Five-Points, and at Cemetery Gate.

I. Docent System: There would be docent-led educational tours available

upon request. Training to be determined.

J. Patrols/Enforcement: Professional vehicular ranger patrols as well as off-trail ranger patrols would be the responsibility of the SFPUC with assistance from San Mateo County Parks and GGNRA personnel. Additionally, this alternative would involve the use of volunteer bike and equestrian patrols to ensure that visitors are not straying off the trails.

K. Fire Protection: Fire protection activities commensurate with those recommended in the Peninsula Watershed Fire Management Plan must be undertaken prior to opening of the trail to the public.

L. Management Responsibility: The SFPUC would maintain management responsibility. Other agencies may contribute additional resources as requested.

M. Water Quality and Ecological Resource Monitoring: Extensive water quality and ecological resource monitoring will be required due to unlimited public access. Exact locations and types of monitoring to be determined. The Water Quality Bureau and the LRMS will work jointly to prepare monitoring plans.

N. Fines: Any individual found performing activities prohibited on the watershed would be cited. These activities include, but are not limited to: dogs on the watershed, fires, smoking, trespassing, off-trail use, and the take of plants or animals.

O. Peninsula Watershed Management Plan Compatibility: All trail activities must be compatible with the policies and management actions of the Peninsula Watershed Management Plan.

P. Improvements Required: The following improvements are required for Alternative A:
   - Improvement for parking of lot at Highway 92/Skyline Boulevard
   - Expansion of parking lot at Sneath Lane
   - Five permanent toilets
   - Three drinking fountains
   - Three phones
   - Three horse water troughs
   - Informational, directional, and regulatory signage
   - Access barriers to intersecting trails/roads accessible on foot, or by bike or horse
   - Ecological resource protection barriers for sensitive resources
   - Ecological and water quality monitoring stations
   - Fire management activities to reduce hazards prior to opening the trail
   - Additional fire equipment to conduct on-going management and response

Alternative B: Unrestricted Access with Termination at Skyline Quarry

Action tra1b (Phase 1) Under **Alternative B - Unrestricted Public Access with Termination at Skyline Quarry** - provide unrestricted public access for hikers, equestrians, and bicyclists along the Fifield/Cahill Ridge Service Road between Portola Gate and Skyline Quarry. This project would be subject to the following requirements:

A. Project Overview: Alternative B is an alternate route proposed by the BARTC and includes unrestricted public access for hikers, equestrians, and bicyclists along the Fifield/Cahill Ridge Service Road between Portola Gate and Skyline Quarry. This alternative is 9.7 miles.

B. Hours of Operation: The trail would be open seven days a week, from 8 a.m. to dusk, all year long. The trail would be closed, gated and locked seven days a week from dusk until 8 a.m. all year long. The trail would be closed during operating hours only if needed for SFWD work, resource protection, habitat migration, storm damage and repair, or fire danger. Where possible, advanced notice would be provided prior to any closures, except in the case of operational, fire, or public safety emergencies.

C. Usage: Alternative B would allow hikers to have independent access during operating hours, on a permanent basis. Bicyclists and equestrians will have independent access during operating hours subject to an annual review of bicycle and equestrian access. If violations of watershed rules and regulations are found to occur consistently by either of these two groups, their privilege of access will be revoked and access rerouted to the eastern edge of the watershed via San Andreas, Sawyer Camp, Crystal Springs and Canada Trails. Alternative B sets no limit on number of users per day. There would be no motorized access except for official authorized vehicles (i.e., SFPUC, CDF, emergency, and law enforcement vehicles).

D. Permit and Reservation System: There would be no permit or reservation system required for access to the Fifield/Cahill Ridge Trail under Alternative B.

E. Fees: There would be no access fees under Alternative B.

F. Parking/Access: Primary parking for Alternative B would be located at Skyline Quarry (Figure 5-3). Secondary access and a trailhead would be located at Portola Gate with parking at Sneath Lane.

G. Restroom Facilities: Five permanent restrooms would be located along

the trail. One each at Sneath Lane; approximately ¼ mile south of Portola Gate; at Five Points; midway between Five Points and Cemetery Gate; and at Skyline Quarry. Each restroom would be, at a minimum, one chemical toilet with a large (approximately 1,000 gallon) vault below. The restrooms would need to be pumped approximately once a week, depending on usage.

H. Support Facilities: Three water fountains and three public telephones would be co-located with the restroom areas at the trailheads at Sneath Lane and Skyline Quarry and at Five-Points. Three water troughs for horses would be required at Sneath Lane, at Five-Points, and at Skyline Quarry.

I. Docent System: There would be docent-led educational tours available upon request. Training to be determined.

J. Patrols/Enforcement: Professional vehicular ranger patrols as well as off-trail ranger patrols would be the responsibility of the SFPUC with assistance from San Mateo County Parks and GGNRA personnel. Additionally, this alternative would involve the use of volunteer bike and equestrian patrols to ensure that visitors are not straying off the trails.

K. Fire Protection: Fire protection activities commensurate with those recommended in the Peninsula Watershed Fire Management Plan must be undertaken prior to opening of the trail to the public.

L. Management Responsibility: The SFPUC would maintain management responsibility. Other agencies may contribute additional resources as requested.

M. Water Quality and Ecological Resource Monitoring: Extensive water quality and ecological resource monitoring will be required due to unlimited public access. Exact locations and types of monitoring to be determined. The Water Quality Bureau and the LRMS will work jointly to prepare monitoring plans.

N. Fines: Any individual found performing activities prohibited on the watershed would be cited. These activities include, but are not limited to: dogs on the watershed, fires, smoking, trespassing, off-trail use, and the take of plants or animals.

O. Peninsula Watershed Management Plan Compatibility: All trail activities must be compatible with the policies and management actions of the Peninsula Watershed Management Plan.

P. Improvements Required: The following improvements are required for Alternative B:

- Construction of parking lot at Skyline Quarry
- Expansion of parking lot at Sneath Lane
- Five permanent toilets
- Three drinking fountains
- Three phones
- Three horse water troughs
- Informational, directional, and regulatory signage
- Access barriers to intersecting trails/roads accessible on foot, or by bike or horse
- Ecological resource protection barriers for sensitive resources
- Ecological and water quality monitoring stations
- Fire management activities to reduce hazards prior to opening the trail
- Additional fire equipment to conduct on-going management and response

Alternative C: Access by Annual Permit

Action tra1c (Phase 1) Under **Alternative C - Access by Annual Permit** - provide pedestrian access to the Fifield/Cahill Ridge Service Road by the purchase of an annual permit. The trail would extend from Sneath Lane in the north to Skyline Quarry in the south. This project would be subject to the following requirements:

A. Program Overview: Alternative C provides access for hikers to the Fifield/Cahill Ridge Service Road by the purchase of an annual permit. The trail would extend 9.7 miles from Portola Gate in the north to Skyline Quarry in the south.

B. Hours of Operation: The trail would be open seven days a week; from 8 a.m. to dusk., all year long. The trail would be closed, locked, and gated from dusk until 8 a.m. seven days a week, all year long. The trail would be closed during operating hours only if needed for SFPUC work, resource protection, habitat migration, storm damage and repair, or fire danger. Closures would be identified on the telephone and Internet reservation systems.

C. Usage: Only hikers with an annual permit would be allowed access under Alternative C. The number of users per day would be limited based upon environmental constraints and user demand. Unauthorized bikers and equestrians (i.e., all but authorized patrols) would be prohibited on the Fifield/Cahill Ridge Trail and would be rerouted to the existing San Andreas, Sawyer Camp, Crystal Springs and Canada Trails via a new 0.6-mile connector trail between Sneath Lane and the San Andreas Trail. Motorized access would be restricted to official authorized vehicles only (e.g., SFPUC, CDF, emergency and law enforcement vehicles). Docent-led tours would also be conducted by reservation under this alternative.

D. Permit and Reservation System: Permits would be issued to individuals who apply for them in writing, and would be valid for one year. Individuals would be required to wear the permits while on watershed property. Permit packets would include a map, trail regulations and an ID card or electronic code for gate/turnstile entry/exit. Permittees would be requested, although not required, to make advanced reservations for the date they want to visit the watershed via telephone or the Internet using their permit number. Drop-ins would be allowed on a first-come, first-served basis.

E. Fees: To be determined by the SFPUC.

F. Parking/Access: Primary parking for Alternative B would be at Skyline Quarry and Sneath Lane. An electronic gate would be installed at Skyline Quarry which would be activated by the users annual permit to control parking. A turnstile would be installed at the Skyline Quarry and Portola Gate trailheads, which would also be activated by the permittee's pass card.

G. Restroom Facilities: Five permanent restrooms would be located along the trail. One each at Sneath Lane; approximately ¼ mile south of Portola Gate; at Five Points; midway between Five Points and Cemetery Gate; and at Skyline Quarry. Each restroom would be, at a minimum, one chemical toilet with a large (approximately 1,000 gallon) vault below. The restrooms would need to be pumped approximately once a week, depending on usage.

H. Support Facilities: Three water fountains and three public telephones would be required, one at Sneath Lane, one at Five-Points, and one at Skyline Quarry.

I. Docent System: There would be docent-led educational tours available upon request. Training to be determined.

J. Patrols/Enforcement: Professional vehicular and off-trail ranger patrols will be the responsibility of SFPUC staff and others to be determined. Alternative C would also involve the use of volunteer horse patrols to ensure that visitors are not straying off the trails. Training for this program is to be determined.

K. Fire Protection: Fire protection activities commensurate with those recommended in the Peninsula Watershed Fire Management Plan must be undertaken prior to opening of the trail to the public.

L. Management Responsibility: The SFPUC would maintain management responsibility with assistance from others to be determined.

M. Water Quality and Ecological Resource Monitoring: Moderate water quality and ecological resource monitoring will be required due to access being limited to hikers. Exact locations and types of monitoring to be determined. The Water Quality Bureau and the LRMS will work jointly to prepare monitoring plans.

N. Fines: Any individual found performing activities prohibited on the watershed would be cited and their permit revoked. These activities include, but are not limited to: fires, smoking, trespassing, off-trail use, and the take of plants or animals.

O. Peninsula Watershed Management Plan Compatibility: All trail activities must be compatible with the policies and management actions of the Peninsula Watershed Management Plan.

P. Improvements Required: The following improvements would be required for Alternative C:

- Parking lot construction at Skyline Quarry
- Five permanent toilets
- Three drinking fountains
- Three public telephones
- Installation and maintenance of an electronic card-activated gate system
- Telephone and Internet reservation system development, implementation, and ongoing staffing
- Access barriers to intersecting trails/roads accessible on foot, or by bike or horse
- Ecological resource protection barriers
- Ecological and water quality monitoring stations
- Fire management activities to reduce hazards prior to opening the trail
- On-going fire management activities to reduce fire hazard
- Directional, informational and regulatory signage
- Professional, docent, and volunteer patrol training
- Medical aid
- Radio communications
- Fire equipment
- ADA improvements, as required
- Monitoring staff and equipment

Alternative D: Docent Led Access

Action tra1d (Phase 1) Under **Alternative D - Docent-Led Access** - allow docent-led access for hikers on scheduled days and times along the Fifield/Cahill Service Road between Sneath Lane and Skyline Quarry. This project would be subject to the following requirements:

A. Project Overview: Alternative D would allow scheduled docent-educational led access for hikers seven days a week along the Fifield/Cahill

Service Road between Portola Gate and Skyline Quarry, a 9.7-mile route.

B. Hours of Operation: Under Alternative D, the trail would be open seven days a week from 8 a.m. to dusk. Gates would remain closed and locked during operating hours with docents providing access to each scheduled group. The trail would be closed during operating hours only if required for SFWD work, resource protection, habitat migration, storm damage and repair, or fire danger. Closures would be identified on the telephone and Internet reservation systems. Those previously scheduled on docent-led tours would be telephoned in the event of emergency closure.

C. Usage: Alternative D would allow hikers to reserve space in scheduled docent-led groups. These groups would be no larger than 25 people. Three groups per day would be allowed, with a maximum of 75 people a day. Unauthorized bikers and equestrians (i.e., all but authorized patrols) would be prohibited on the Fifield/Cahill Service Road and would be rerouted to the existing San Andreas, Sawyer Camp, Crystal Springs and Canada Trails via a new 0.6-mile connector trail between Sneath Lane and San Andreas Trail. Motorized access would be restricted to official authorized vehicles only (e.g., SFPUC, CDF, emergency and law enforcement vehicles).

D. Permit and Reservation System: Docent led tours along the Fifield/Cahill Ridge Trail would not require a permit. Reservations would be accepted through both telephone and Internet reservation systems. Users would reserve space in one of the three daily scheduled docent-led groups. Hikes would be rated as easy, moderate and difficult and would begin at different points to allow for a variety of experiences.

E. Fees: To be determined by SFPUC.

F. Parking/Access: Primary parking for Alternative D would be at Skyline Quarry and Sneath Lane. There would be one tour daily leaving from Skyline Quarry, Portola Gate, and Cemetery Gate and leaving from other locations by special arrangement. Docents would be responsible for operating the access gates at these points.

G. Restroom Facilities: Five permanent restrooms would be located along the trail: one each at Sneath Lane; approximately ¼ mile south of Portola Gate; at Five Points; midway between Five Points and Cemetery Gate; and at Skyline Quarry. Each restroom would be a chemical toilet with a large (approximately 1,000 gallon) vault below. The restrooms would need to be pumped approximately every two weeks, depending on usage.

H. Support Facilities: Three water fountains and three public telephones would be required, one at Sneath Lane, one at Five-Points, and one at Skyline Quarry.

I. Docent System: The docent-led tours would be available by reservation only and tours would occur three times per day, seven days per week. Docents would require training in the protection of water quality; sensitive plant and animal species; basic first aid; and interpretation of watershed resources. An SFPUC staff member would be responsible for overseeing the docent program. It is estimated that docents would be volunteers from the community. A coordinator is also envisioned.

J. Patrols/Enforcement: Professional vehicular and off-trail ranger patrols will be the primary enforcement patrols under Alternative D and will be the responsibility of SFPUC staff and others to be determined. Volunteer horse patrols will be used to ensure that visitors are not straying off the trails. Training for this program to be determined.

K. Management Responsibility: The SFPUC will maintain management responsibility. Additional assistance from other agencies may be negotiated.

L. Water Quality and Natural Resource Monitoring: Limited monitoring would be required due to controlled access.

M. Fines: Any individual found performing activities prohibited on the watershed would be cited and their privilege of future access revoked. These activities include, but are not limited to: fires, smoking, trespassing, off-trail use, and the take of plants or animals.

N. Peninsula Watershed Management Plan Compatibility: All trail activities must be compatible with the policies and management actions of the Peninsula Watershed Management Plan.

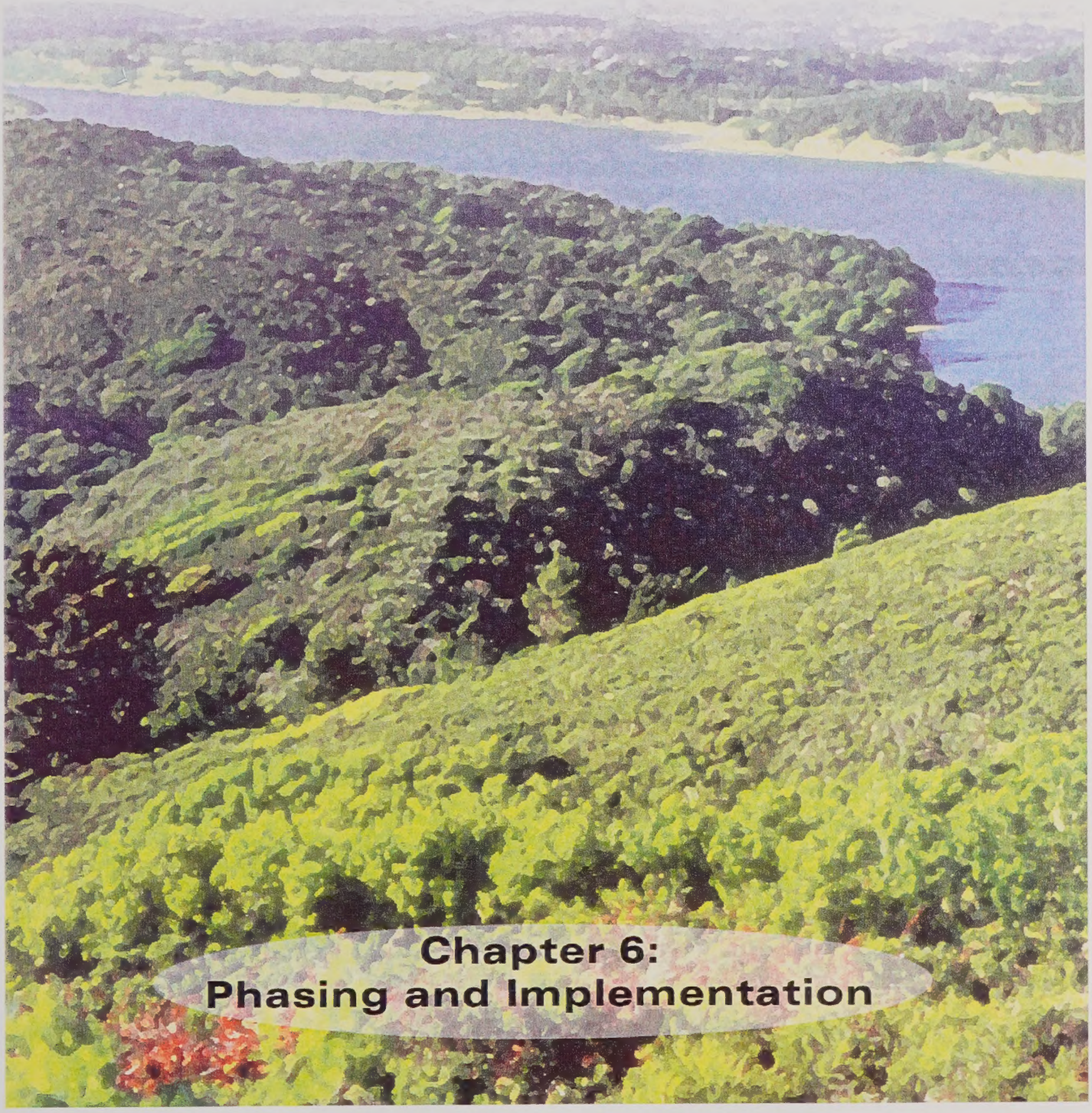
O. Improvements Required: The following improvements would be required for Alternative D:

- Parking lot construction at Skyline Quarry
- Five permanent toilets
- Three drinking fountains
- Three public telephones
- Telephone and Internet reservation system development, implementation, and ongoing staffing
- Directional, informational and regulatory signage
- Professional, docent and volunteer patrol training
- Medial aid
- Radio communications
- Fire equipment

Alternative A/B: Programmatic Skyline Boulevard Alignment from Highway 92/Skyline Boulevard

Action tra2 (Phase A) Under Alternative A/B: Programmatic Skyline Boulevard Alignment from Highway 92/Skyline Boulevard provide a 4.6-mile southern extension of the project described in Alternative A: Unrestricted Access with Termination at Highway 92/Skyline Boulevard. This route provides access south of Highway 92 along Skyline Boulevard to **connect to the Kings Mountain trail**. This alignment would either follow Skyline Boulevard or require construction of a new trail on SFPUC property and/or private property adjacent to Skyline Boulevard. Support facilities that would likely be required include a parking/staging area, restrooms, drinking fountains, public telephones, and horse water troughs. Additional rangers and ranger patrols as well as volunteers would be required to patrol the Skyline Boulevard Alignment. Additional fire management activities would be required to reduce the risk of fire.

To provide access to this programmatic alignment under Alternative B: Unrestricted Access with Termination at Skyline Quarry, the trail which is to be constructed adjacent to Highway 92, as part of the Highway 92 widening project, would be used. This trail would provide the connection between Skyline Quarry and the Highway 92/Skyline Boulevard intersection. The Highway 92 trail will not be addressed as part of the Peninsula Watershed Management Plan and EIR as it is being addressed as part of the Highway 92 widening project.



Chapter 6:
Phasing and Implementation

Chapter 6. Phasing and Implementation

6.1 Introduction

This chapter provides the framework necessary to implement the management actions defined in Chapter 5. Implementation of these actions includes a determination of the phase in which an action should be undertaken and which agencies or individuals (other than SFPUC) are responsible for, or need to be coordinated with, to carry out each action (as applicable). The management actions, phase of implementation, and coordination responsibilities are summarized in Table 6-1. The table also includes a short description of the management action with key words highlighted in bold type, coordination responsibilities with other responsible agencies/groups, and the applicable section number in Chapter 5 where the actions are described in further detail.

6.2 Phasing and Implementation

The Peninsula Watershed Management Plan will be implemented over the 20-year timeframe. The Plan will be reviewed and updated periodically, as needed, with a complete review and update of the Plan required at the end of the 20-year time period. The goals and policies of the Plan are fixed; however, the management actions are meant to be revised and updated as necessary thus, providing flexibility with respect to when and how they actually get implemented. Phasing of the management actions is identified by one or more of the following categories:

(1) within 5 years of plan adoption;
(2) within 10 years of plan adoption;
(3) within 20 years of plan adoption; and/or
(A) on an as-needed basis; and
(B) at regular intervals throughout the life of the plan.

Some management actions have been assigned two phasing types, for example, Management Action pub10 is assigned a phase of (2)(A). This action calls for providing (Phase 2) and periodically updating (Phase A) select watershed information on the SFPUC's Internet website. In Phase 2 the select information will be defined and inserted into the website. Thereafter, Phase A will provide the opportunity for updating the website information on an as-needed basis. Similarly, Action saf10, which calls for daily boat patrols of the Peninsula Watershed reservoirs to assess emergency situations is a (1)(B) phasing. This indicates that

this activity should commence in Phase 1 and the patrols should continue at regular intervals, in this case daily, throughout the life of the Plan (B).

In general, phasing priorities are related to the ability of an action to help the SFPUC achieve the primary goal — maintaining and improving source water quality. Actions that are most critical to meeting this goal were assigned to Phase 1. These include many of the fire, road, and grazing management actions. Staffing and training actions pertaining to watershed safety are also included in Phase 1. Phase 2 items are also integral to maintaining and improving water quality but may have less of a far-reaching effect. Certain Phase 2 actions also are follow-on tasks or monitoring related to actions initiated in Phase 1. Phase 3 tasks, although still very important, are more integral to achieving the other watershed management goals or are actions not likely to occur for at least 10 years.

Actions ranked solely as (A) are generally to be conducted prior to any new construction activities either within or adjacent to the watersheds. There are no actions ranked as (B) alone, as these actions are required to occur at regular intervals throughout the life of the Plan. Therefore, a phase was also assigned to initiate these periodic activities.

The information provided in Table 6-1 is to be used in conjunction with the more detailed management actions presented in Chapter 5 and, where applicable, information provided in Plan appendices. For example, for an action related to Fire Management the reader is encouraged to refer back to Chapter 5 for the full description of the management action, then to the Fire Management Element (Appendix A-1) for the complete set of directions required to implement the given action.

Table 6-1 Implementation of the Peninsula Watershed Management Actions by Phase

Phase	Mgmt. Actions	Description	Coordination	Section
Phase 1				
(1)	**sto3**	As part of the **Highway 92** widening project, assure that a **stormwater collection** and filtration system is included.	CalTrans	5.2
(1)	**haz1**	Develop **hazardous chemical management procedures** addressing the type, use, storage, and disposal of hazardous chemicals used in watershed activities.	Lessees	5.3
(1)	**haz4**	Identify key locations for, and install, **barriers or fencing** to prevent access to reservoir edges and dams.	CalTrans	5.3
(1)	**haz5**	Conduct regular servicing for the SFPUC vehicle fleet and equipment so that leaks/drips/spills of **contaminants** are minimized.	SFPUC Shops Operations	5.3
(1)	**haz6**	Review and standardize SFPUC **boating practices**.	Water Quality Bur.	5.3
(1)	**haz7**	Develop and implement a clean-up and enhancement plan for **Skyline Quarry**	CalTrans	5.3
(1)	**haz8**	Identify **high-risk spill potential areas** and implement measures to reduce the risk of hazardous spills.		5.3
(1)	**haz9**	**Install barriers** on Upper Crystal Springs Dam.	CalTrans	5.3
(1)	**haz10**	**Develop spill response and containment measures** for SFPUC vehicles on the watershed.		5.3
(1)	**haz11**	**Train** staff in **spill response and containment** measures for SFPUC vehicles.		5.3
(1)	**haz12**	Maintain a **network of hazardous materials clean-up storage lockers** at accessible locations on each reservoir and at areas where spill potential is high.		5.3
(1)	**was5**	Coordinate with the GGNRA **to install restrooms on Army Road**.	GGNRA	5.4
(1)	**roa1**	Evaluate, rank the importance of, and implement **modifications to the existing road system** to reduce erosion and sedimentation.	CDF, Lessees	5.5
(1)	**roa2**	**Relocate** existing **high use roads**/road segments in proximity to streams (i.e., within 150 feet) that are the primary source of excessive erosion and sedimentation.	CDF, Lessees	5.5

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(1)	**roa3**	**Modify** the grading and drainage of existing **high use roads**/road segments to reduce the potential for erosion and sedimentation.	CDF San Mateo County	5.5
(1)	**con2**	Evaluate the feasibility of, and where possible, **use raw untreated water or reclaimed water** for roadways, Filoli Estate, Crystal Springs Golf Course, irrigation, sanitation facilities, fire suppression, etc.	Lessees, CDF Water Quality Bur.	5.6
(1)	**con3**	Identify appropriate locations for **additional native trees and shrubs**.	CDFG, CNPS	5.6
(1)	**fir2**	**Install** seven **dry hydrants** at specified locations to reduce the complexity of long-distance water shuttle operations.	CDF, Lessees	5.7
(1)	**fir3**	**Install and maintain** five **helispots** at specified locations on the watershed.	CDF, Lessees	5.7
(1)	**fir4**	Work with adjacent landowners to install two **additional hydrants** at specified locations.	CDF, Lessees, Adjacent Lessees	5.7
(1)	**fir5**	**Install** two 10,000 gallon metal **water tanks** at specified locations.	CDF	5.7
(1)	**fir6**	Undertake improvements to provide better **access to enhance fire suppression** capabilities.	GGNRA, CDF	5.7
(1)	**fir7**	Identify and construct necessary road improvements including necessary **turnouts, turnarounds, and safety signs**.	CDF County Fire Dept. San Mateo County	5.7
(1)	**fir12**	Prepare and distribute **maps and information** showing safe zones, turnout locations, helispots, fuel break locations, natural barriers, evacuation routes, and areas of limited suppression.	CDF, Local Fire Departments San Mateo County Parks Dept., GGNRA, Filoli Estate, Mid-Peninsula Open Space District	5.7
(1)	**fir13**	Assign the duties of **implementation of the Fire Management Plan** and incident commander to an existing or new **LRMS staff member**.		5.7
(1)	**saf1**	Develop **law enforcement procedures** for SFPUC and LRMS staff	San Mateo County Parks Dept., CDFG County Sheriffs Dept.	5.8
(1)	**saf2**	Develop and implement an LRMS **safety and security program** to address safety and emergency response procedures on the watershed.	Lessees, San Mateo County Parks Dept., GGNRA, CalTrans	5.8

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(1)	**saf3**	Designate and train an LRMS **safety coordinator** to oversee the safety and security program and train employees in safety and emergency response procedures.	BERM	5.8
(1)	**saf15**	Review utility emergency response plans for non-SFPUC **pipeline failure procedures**.	Utilities	5.8
(1)	**saf17**	Coordinate with San Mateo County to develop a **schedule of fines and penalties** for watershed infractions.	San Mateo County	5.8
(1)	**veg10**	Identify areas of **slope instability** and failure based on soils, geology, and landslide data layers in the GIS. Prevent erosion by following the BMPs.		5.9
(1)	**veg11**	Identify and indicate in the GIS areas where land disturbance has accelerated **mass movement or soil erosion** processes to unacceptable levels. Stabilize these areas using soil conservation BMPs.		5.9
(1)	**veg 13**	Develop and implement an **IPM program for the LRMS, specific to the watershed and watershed resources.**		5.9
(1)	**veg14**	Coordinate with **PG&E** in **clearing vegetation** as appropriate around powerlines, transformers, and pole structures.	PG&E Bur. of Commercial Lands	5.9
(1)	**veg16**	Coordinate with CDFG's restoration of the **San Mateo thornmint habitat**.	CDFG	5.9
(1)	**veg17**	Encourage agencies to minimize disturbance of **serpentine bedrock or soils** to prevent erosion of asbestos fibers into the water supply.	CDFG, CalTrans, County Parks Dept.	5.9
(1)	**wil10**	**Institute seasonal prohibition of activities** during breeding periods and enact appropriate mitigation measures to protect species of concern.	Lessees, CDFG, County Parks Dept., GGNRA	5.10
(1)	**wil11**	Inventory and map **butterfly habitat.**	CDFG	5.10
(1)	**aqu2**	**Manage reservoir water levels** according to the Operations Plan to maintain relatively stable water levels.	Operations	5.11
(1)	**aqu3**	Identify and **prioritize for rehabilitation reservoir shoreline areas** within the High WQVZ which are providing excessive sedimentation into the reservoirs.	CDFG, RWQCB, COE	5.11

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(1)	**aqu5**	**Rehabilitate shoreline areas** using structural shoreline protection practices in areas where erosion and sedimentation cannot be adequately controlled by land use restrictions.	CDFG, COR, USFWS, Lessees COE, County Parks Dept.	5.11
(1)	**aqu6**	Conduct a **Sediment Transport Study** to identify stream segments with excessive bank erosion or channel sedimentation and prioritize segments for rehabilitation.	CDFG, COE, USFWS, EBRPD, Lessees	5.11
(1)	**fis1**	Maintain **access for fish species of concern** from reservoirs to upstream spawning grounds.	CDFG, USFWS, Lessees	5.12
(1)	**fis6**	Identify and adopt alternative **non-toxic management practices** to protect aquatic resources.	CDFG, Lessees, County Parks Dept.	5.12
(1)	**env1**	Assign **environmental compliance duties** to an LRMS staff person to oversee and facilitate all environmental compliance within the watershed.	OER, BERM	5.14
(1)	**env5**	**Incorporate mitigation measures** identified in the program-level EIR into the Peninsula Watershed Management Plan.		5.14
(1)	**lea1**	Develop a **Scientific, Educational, and Agency Permit Reservation System**.		5.15
(1)	**lea2**	**Develop a Watershed Information and Public Access Permit Reservation System** that is informative and easy to use.		5.15
(1)	**lea3**	In coordination with the Bureau of Commercial Land Management, **ensure that all lease renewals and new leases** include water quality protection measures, required BMPs, emergency response plans, monitoring programs.	Lessees Water Quality Bur. BCLM	5.15
(1)	**lea7**	Assign the duties of **lease coordinator** to an existing or new LRMS staff member.	BCLM	5.15
(1)	**pub1**	Develop and implement an overall **Watershed Public Education Program.**		5.16
(1)	**pub2**	Designate an LRMS staff person to **oversee the Watershed Public Education Program.**		5.16
(1)	**pub3**	**Establish** "gateway" information **kiosks** at major entryways to the watershed.	County Parks Dept., GGNRA	5.16

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(1)	**pub6**	Develop a **mobile watershed exhibit** to be displayed at popular Bay Area locations and local schools.	Local Cities and School Districts	5.16
(1)	**pub7**	Develop a **public use areas map**.	County Parks Dept. GGNRA	5.16
(1)	**pub8**	Develop **brochures and displays** to be used at watershed kiosks and the Education Center.	County Parks Dept., GGNRA, CDFG	5.16
(1)	**pub9**	**Publish rules and regulations** regarding prohibited and permitted uses, potential hazards, emergency numbers, etc. in brochures, bulletins, water bill inserts, newsletters, etc.		5.16
(1)	**pub11**	Develop a **docent program** to allow individuals access to select areas of the watershed that are generally closed to public access.	GGNRA, County Parks Dept.	5.16
(1)	**pub13**	Develop **written agreements** with public and private **landowners** outside of SFPUC-owned watershed lands to institute voluntary restrictions on land uses and activities that will protect water quality.	San Mateo County ACRCS	5.16
(1)	**pub16**	Coordinate with **Bay Area schools and universities** to develop watershed-based curriculum/projects.	Bay Area Schools/Universities	5.16
(1)	**sta1**	**Evaluate** all existing **LRMS staff responsibilities** to assure there are an adequate number of positions.		5.17
(1)	**sta2**	Evaluate all watershed operations and maintenance activities and **establish standards for staff** and time allocations for each activity.		5.17
(1)	**sta3**	Assign an LRMS **staff member to oversee watershed maintenance activities** not under the direct authority of LRMS staff.		5.17
(1)	**sta4**	**Provide adequate staff** to monitor legal and illegal watershed activities.		5.17
(1)	**sta5**	Provide additional **training for** watershed keepers and LRMS staff to attain **Peace Officer** status.	County Parks Dept. County Sheriff's Dept CDF, Water Quality Bur., CDFG	5.17

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(1)	**sta6**	**Conduct water quality and ecological resources training** for LRMS staff, operations supervisors and crews, SFPUC UEB engineers, and project managers.	Water Quality Bur.	5.17
(1)	**sta7**	**Conduct training classes** for watershed managers, watershed keepers, and crew supervisors on the management and protection of significant **cultural resources**.	SHPO	5.17
(1)	**sta8**	**Provide mandatory training for** all appropriate SFPUC staff to become familiar with **this Watershed Management Plan** and the required procedures.		5.17
(1)	**sta9**	**Train** selected staff and docents **to provide meaningful interpretation** of watershed resources and to assist with community outreach.		5.17
(1)	**sta10**	**Provide fire-related training** to select staff members as appropriate.	CDF, CDFG County Fire Dept.	5.17
(1)	**sta11**	Establish an **employee training** program **for safety and emergency response** procedures.	County Sheriff's Departments CDF County Fire Dept.	5.17
(1)	**fic8**	**Evaluate** and rank all **lands** within the hydrologic watershed outside of SFPUC's landholdings **for potential purchase**.	San Mateo County Planning Dept. City Planning Depts.	5.18
(1)	**fic10**	Develop and implement a **schedule of fines** and/or penalties for failure to meet lease requirements.	Bur. of Commercial Lands	5.18
(1)	**inf2**	Assign **GIS database** operations maintenance **duties** to an LRMS staff member.		5.19
(1)	**inf5**	Assign the duties of **Web Page maintenance** to an LRMS staff member.		5.19
(1)	**des3**	Assign an LRMS staff person to be the **Proposed Projects Review Coordinator**.		5.20
(1)	**des7**	Establish a **universal access program** to address all watershed facilities and trails.	EBRPD	5.20
(1)	**tra1a**	**Alternative A - Unrestricted Public Access with Termination at Highway 92/Skyline Boulevard**: provides for unrestricted public access subject to specific requirements.	County Parks Dept. GGNRA	5.22
(1)	**tra1b**	**Alternative B - Unrestricted Public Access with Termination at Skyline Quarry**: provides for unrestricted public access subject to specific requirements.	County Parks Dept. GGNRA	5.22

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(1)	**tra1c**	**Alternative C - Access by Annual Permit**: provides for pedestrian access subject to specific requirements.	County Parks Dept. GGNRA	5.22
(1)	**tra1d**	**Alternative D - Docent-Led Access**: allows for docent-led access for hikers subject to specific requirements.	County Parks Dept. GGNRA	5.22
(1)	**tra2**	If Alternative A or B - Unrestricted Public Access is to be provided, then develop the Programmatic Skyline Boulevard Alignment, a southern extension of the project, to connect to the Kings Mountain Trail.	County Parks Dept. GGNRA	5.22
(1)(A)	**fir1**	Prior to authorizing the use of any vehicle or equipment on the watershed require that SFPUC equipment **comply with fire prevention regulations**.	CDF, Lessees, Contractors	5.7
(1)(A)	**saf16**	**Coordinate with appropriate agencies** in maintaining and enforcing the safety and security program.	GGNRA County Sheriff, County Parks Dept.	5.8
(1)(A)	**wil8**	**Maintain** an up-to-date **database** on sensitive species within the watershed.	USFWS, CDFG	5.10
(1)(A)	**wil16**	**Support CDFG** in their **efforts** to enforce and monitor state rules and regulations on the Peninsula Fish and Game Refuge.	CDFG	5.10
(1)(A)	**aqu4**	**Prohibit or regulate** the timing or intensity of **land use activities** in high risk shoreline areas consistent with other management actions in this Plan.	CDFG, EBRPD, Lessees, CalTrans	5.11
(1)(A)	**fis7**	Dechlorinate **water discharged** from the Pulgas Water Temple into Upper Crystal Springs Reservoir by chemical means.		5.12
(1)(A)	**fis11**	Participate in the **Pilarcitos Creek Restoration Project**.	CDFG City of Half Moon Bay	5.12
(1)(A)	**fis12**	Cooperate with state implementation of programs to **increase salmon and steelhead populations**.	CDFG	5.12
(1)(A)	**pub10**	Provide and periodically update select **watershed information** to the public and other agencies **using** SFPUC's Internet **website**.	BEMIS	5.16

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(1)(A)	**fic5**	**Target funds for watershed management** activities and staff positions according to priorities, available funding, and the ability to provide funding.		5.18
(1)(A)	**fic9**	Coordinate with upstream landowners to develop and place a **natural and cultural resources conservation easement** over non-SFPUC owned watershed lands.	CDFG, San Mateo County GGNRA	5.18
(1)(A)	**des1**	Meet with proponents of new plans and projects prior to detailed design or development to identify **requirements of the Watershed Management Plan** which must be met.		5.20
(1)(A)	**des2**	Evaluate all proposed plans and projects as part of the Review Process for Proposed Plans and Projects using the **Watershed Goals and Policies Compliance Checklist**.		5.20
(1)(A)	**gol5**	Conduct project-level environmental studies to assess the **impacts of the golf course on wildlife**.	Lessee	5.21
(1)(A)	**gol6**	Conduct project-level environmental studies to assess the **impacts of the golf course on vegetation**.	Lessee	5.21
(1)(B)	**sto2**	Field verify on a biannual basis that stormwater **runoff from I-280** is exported out of the watershed.	CalTrans	5.2
(1)(B)	**haz14**	Practice **interagency spill response**. Where needed, improve elapsed time between spill event and notification of SFPUC staff.	CalTrans, San Mateo County	5.3
(1)(B)	**haz15**	Maintain routine contact with the FAA regarding notification of **jet fuel releases.**	FAA	5.3
(1)(B)	**roa7**	**Maintain fire roads** to minimize sediment generation through effective installation of waterbars, avoidance of unnecessary grading, and paving short lengths of road.	CDF	5.5
(1)(B)	**con1**	Periodically evaluate **landscaping and irrigation practices** for water efficiency; implement water conservation techniques where necessary.	Lessees	5.6
(1)(B)	**con4**	**Reduce** large volumes of **brush** to increase water yields through a reduction in transpiration losses.	CDFG, CNPS	5.6

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(1)(B)	**fir8**	Complete the **fuel management projects** listed in Chapter 5 and described in the Fire Management Element (Appendix A, Volume I) to reduce fuels on the watershed.	CDF, CDFG, BAAQMD	5.7
(1)(B)	**saf4**	Regularly **inspect and maintain** the facilities and areas used by the public.	Lessees, San Mateo County Parks Dept, GGNRA	5.8
(1)(B)	**saf5**	Conduct regular, **on-site risk assessment inspections** of SFPUC facilities in conjunction with the safety and security program and other maintenance activities.	Lessees, GGNRA, County Parks Dept.	5.8
(1)(B)	**saf6**	Periodically and systematically **inspect** watershed perimeter **fencing, access gates, and locks** and repair as required to minimize trespassing, illegal dumping, etc.	Lessees, GGNRA, County Parks Dept.	5.8
(1)(B)	**saf7**	Develop and periodically revise an **Emergency Response Plan**.	Lessees, Utilities, CalTrans, CDF, County Sheriff's Department, GGNRA, OES, CDFG, Filoli Estate	5.8
(1)(B)	**saf8**	Periodically conduct **emergency response practice drills**.	Lessees, Utilities, CalTrans, CDF, County Sheriff's Departments, GGNRA, OES, CDFG, Filoli Estate, County Parks Dept.	5.8
(1)(B)	**saf9**	**Periodically evaluate and update** the **safety and security program**.	Lessees, CalTrans, CDF, County Sheriffs Department, CDFG, GGNRA, County Parks Dept.	5.8
(1)(B)	**saf10**	Conduct **daily boat patrols** of all Peninsula reservoirs to assess water quality emergencies, trespassing problems, and other emergency situations.		5.8
(1)(B)	**saf11**	Maintain four **LRMS patrol boats** for ongoing patrols and emergencies		5.8
(1)(B)	**saf12**	Develop, publish, and periodically update a **Watershed Manual** that addresses SFPUC operations and maintenance procedures, emergency response procedures, and the safety and security program.	Lessees, CDFG, County Parks Dept.	5.8
(1) (B)	**saf14**	Coordinate with the San Mateo County Sheriff and Fire Departments to develop and periodically update an **evacuation plan** for disasters.	County Sheriff and Fire Departments OES	5.8

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(1)(B)	**lea4**	**Develop** a **water quality protection and monitoring plan for each lease** to identify water quality improvements and to quantify potential water quality impacts of lease operations and permitted activities.	Water Quality Bur.	5.15
(1) (B)	**fic7**	**Evaluate alternative** sources of **funding and implementation** methods for continuing to provide public use activities on the watershed.	County, CDFG, County Parks Dept., Schools and Universities, GGNRA, Sierra Club, CNPS, Audubon Society	5.18
(1)(B)	**gol4**	Converse, on a regular basis, the **Southern Peninsula Golf Course Oversight Committee** to assure SFPUC policies are being met.		5.21
Phase 2				
(2)	**haz3**	Identify and prioritize for removal from SFPUC lands, **dump sites** that pose a hazard to water quality and watershed resources.	Lessees, CDFG San Mateo County	5.3
(2)	**was1**	Inspect all SFPUC facilities to assess conditions of **vault, chemical, and composting toilets**; repair/replace as necessary to minimize risk of contamination of water supplies.	Lessees Water Quality Bur. Operations	5.4
(2)	**was2**	Inspect sanitation and waste treatment systems at **Crystal Springs Golf Course, Filoli Estate, CalTrans rest stop/yard, and San Mateo County Parks** to assess condition, performance, and impacts on surface and groundwater quality.	Lessee Filoli Estate, CalTrans, San Mateo County Parks Dept., Water Quality Bur.	5.4
(2)	**roa4**	**Close and retire (regrade, revegetate, restore) roads** not needed for safety or access and minimize problem areas by paving, installing culverts, or other stabilization methods.	CDFG, Lessees San Mateo County Santa Clara County	5.5
(2)	**roa5**	**Reduce the need for multiple** maintenance access **roads** on infrastructure easements by consolidation.	Utilities, Lessees	5.5
(2)	**roa8**	**Restrict access on low use roads** by gates or barriers, allow revegetation, and use mowing as the road maintenance, or provide waterbars or broad dips.	CDF, Lessees	5.5
(2)	**fir14**	Establish **permanent transects** and vegetation plots in treatment and control areas to determine effects of fuel management treatments.		5.7

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(2)	**saf13**	Work with CalTrans and San Mateo County to **install signs and emergency call boxes and emergency response telephone numbers** on I-280, and Highway 92 about risk of fires, vehicle accidents, risk of spills.	CalTrans, San Mateo County	5.8
(2)	**veg1**	Prepare and implement a **Vegetation Management Plan**.	CDFG, CDF, GGNRA, County Parks Dept.	5.9
(2)	**veg5**	Develop **native species planting program** in coordination with fire management activities.	CDF, CDFG, County Parks Dept., GGNRA	5.9
(2)	**veg8**	Develop **forest management prescriptions** and guidelines for both hardwood and coniferous tree species.	CDFG	5.9
(2)	**wil9**	Develop a comprehensive, multi-species **Habitat Conservation Plan** for the species of concern on the watershed. This HCP should cover the actions set forth in this plan and other SFPUC activities anticipated over the next 50 years.	USFWS, CDFG	5.10
(2)	**aqu7**	**Rehabilitate stream segments** according to the determined priorities, and return them to a dynamic equilibrium where the channel is stable.	CDFG, USFWS RWQCB COE	5.11
(2)	**aqu10**	Develop a **sedimentation basin and pond management program** in conjunction with preparation of the HCP.	COE CDFG	5.11
(2)	**aqu13**	In conjunction with development of the HCP and sedimentation basin management program, obtain a "blanket" **Streambed Alteration Agreement** (MOU) from the CDFG for development, operation, and maintenance of sediment detention basins.	CDFG	5.11
(2)	**fis2**	Identify all **unauthorized stream diversions** and remove those that are detrimental to fish passage in adherence to all existing regulations.	CDFG, RWQCB, COE	5.12
(2)	**fis5**	Allow **the accumulation of woody debris** to accumulate in stream channels, consistent with CDFG recommendations, to create pools and riffles, reduce bank steepness, and provide cover.	CDFG, Lessees	5.12
(2)	**cul9**	Implement **protective measures** to eliminate and minimize effects of public access on cultural resources.	County Parks Dept., Lessees CDFG	5.13

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(2)	**pub4**	**Establish a Watershed Visitor Education Center** to provide a gathering place for the discussion of water quality/supply concerns, water conservation, ecological resource studies, etc.	County Parks Dept., Water Quality Bur., GGNRA	5.16
(2)	**pub5**	Develop a coordinated **graphics and signage program and** supporting **manual**.	County Parks Dept., GGNRA, CDFG	5.16
(2)	**pub15**	**Coordinate** with federal, state, regional, and local agencies on the development of watershed **educational displays and brochures**.	County Parks Dept., GGNRA, CDFG	5.16
(2)	**inf1**	**Establish and staff a Watershed Natural Resources Center** for use by SFPUC staff and other interested individuals and groups.	CDFG, GGNRA, CNPS	5.19
(2)	**des8**	Using the priorities established in Action des7, implement **universal access improvements** at SFPUC facilities and trails.	County Parks Dept.	5.20
(2)(A)	**sto1**	Assess **on-site stormwater** collection and drainage **systems** for adequate sizing and erosion. Remediate where necessary.	Lessees	5.2
(2)(A)	**roa6**	**Inspect and manage unpaved roads**, stormwater collection systems, unlined stormwater conveyance systems, and other stormwater facilities according to the California Forest Practices Act Rules.	CDF	5.5
(2)(A)	**veg15**	Collaborate with CNPS and CalTrans in **restoring native plant communities** along the **I-280 right-of-way.**	CNPS, CalTrans	5.9
(2)(A)	**fis4**	Consult with CDFG regarding the **installation of fish screen and/or fish passage structures** where stream alteration/diversion cannot be avoided.	CDFG, USFWS	5.12
(2)(B)	**haz2**	Inventory and annually monitor all above- and below-ground **fuel storage tanks**, refueling stations, and vehicle maintenance yards.	Lessees San Mateo County Filoli Estate	5.3
(2)(B)	**roa9**	**Periodically inspect closed roads** to ensure vegetation stabilization and drainage measures are operating as planned; conduct reseeding and drainage maintenance as needed.	CDFG, CDF	5.5

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(2)(B)	**roa10**	Conduct **annual inspections and repairs** to reshape roads to conserve material, retain the design cross section and prevent or remove irregularities that retard normal surface runoff.	Lessees	5.5
(2)(B)	**veg6**	Identify and remove **invasive exotic plant species** using IPM practices.	CDFG, GGNRA	5.9
(2)(B)	**veg7**	Identify and remove stands of **exotic forest species** such as eucalyptus, Monterey pine, and Monterey cypress.	CDFG, GGNRA	5.9
(2)(B)	**veg12**	Establish and conduct **long-term hillslope erosion and sediment control monitoring** to evaluate the effectiveness of adopted protection measures.		5.9
(2)(B)	**wil15**	**Monitor pest animal** populations to evaluate success in meeting population targets.	CDFG	5.10
(2)(B)	**aqu8**	Establish and conduct long-term **stream corridor monitoring** to evaluate the effectiveness of adopted protection measures and/or rehabilitation projects.	CDFG	5.11
(2)(B)	**aqu14**	Periodically **update the Bathymetry Study** for the Peninsula reservoirs to assess the impacts of stream and sedimentation basin rehabilitation on reduction in sediment transport.		5.11
(2)(B)	**fis3**	Ensure that any **subimpoundments** within perennial or intermittent drainages allow for fish passage.	CDFG, Lessees	5.12
(2)(B)	**fis8**	Conduct strictly **regulated non-native fish depredation** to control populations of predaceous exotic game fish.	CDFG, County Parks Dept.	5.12
(2)(B)	**fis9**	Conduct **annual surveys** of fish populations and habitat conditions in conjunction with water temperature and water quality monitoring.	CDFG Water Quality Bur. Environmental & Field Services	5.12
(2)(B)	**cul11**	**Periodically inspect historic structures** for pest damage and use IPM techniques to control pests in historic structures.	BERM Water Quality Bur.	5.13
(2)(B)	**cul12**	**Periodically monitor known significant cultural resource sites** for evidence of disturbance, damage, or vandalism.	Lessees, County Parks Dept.	5.13

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(2)(B)	**gol7**	**Conduct trapping** and tissue sampling of a minimum of two predator species every two years to **identify impacts to wildlife species**.	CDFG	5.21
Phase 3				
(3)	**was3**	Assess the contribution of **wildlife excrement** to water quality degradation. Based on monitoring, develop management strategy if necessary.	CDFG Water Quality Bur.	5.4
(3)	**wil3**	Identify and protect **primary wildlife movement corridors** and design fencing, culverts, stream crossings, and underpasses to accommodate wildlife passage.	CDFG, Lessees, County Parks Dept., CalTrans	5.10
(3)	**wil4**	Relocate or **eliminate unnecessary infrastructure** and facilities to reduce fragmentation and disruption of terrestrial habitat.	CDFG, Lessees, Filoli Estate	5.10
(3)	**wil5**	**Remove or relocate unnecessary fencing** to manage wildlife movement.	CDFG, Lessees, County Parks Dept.	5.10
(3)	**wil6**	Establish a **standard for number of snags**/fallen trees per acre for wildlife use and nutrient cycling. Downwood and brush piles should be left as habitat and cover.	CDFG, Lessees, County Parks Dept.	5.10
(3)	**pub17**	Identify and implement watershed ecological **restoration projects** or monitoring studies as components of watershed-based curriculum in applicable Bay Area schools and universities.	Bay Area Schools/Universities	5.16
(3)(A)	**wil7**	Create palatable **re-sprouting browse** through mechanical vegetation treatments or prescribed fire in brush and woodland communities.	CDFG, County Parks Dept., Lessees	5.10
(3)(B)	**wil13**	**Monitor predator-prey relationships** to provide a basis for management and control, especially for ground squirrels, golden eagles, mountain lions, coyote, and deer.	CDFG, USFWS	5.10
Phase A				
(A)	**sto4**	Upon completion of the **Highway 92** widening project, periodically field verify that **stormwater runoff** is adequately collected and filtered.	CalTrans	5.2
(A)	**haz13**	Require CalTrans to include **spill containment and diversion facilities** in new and upgraded facilities along I-280 and Highway 92.	CalTrans, CHP RWQCB San Mateo County Hazmat	5.3

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(A)	**was4**	Consult with San Mateo County regarding **new residential development**.	County Planning and Environmental Health Departments	5.4
(A)	**roa11**	Monitor road conditions during **heavy use periods** and/or unfavorable weather conditions; limit use on the basis of road condition; close roads seasonally if warranted.	Lessees, CDF, County Road Depts.	5.5
(A)	**roa12**	Design, site, and construct **new roads** following **guidelines** appropriate for wildland conditions.	CDF, CDFG	5.5
(A)	**fir9**	LRMS staff shall **report and provide preliminary assessment** of all fires to watershed dispatch who will call 911 and notify the watershed manager.	CDF County Fire Dept.	5.7
(A)	**fir10**	**Initial response** shall be made if a fire appears to be easily suppressed. If the fire is large or intense, evacuate and report situation to watershed dispatch.	CDF County Fire Dept.	5.7
(A)	**fir11**	If an **evacuation** is necessary, watershed dispatch shall contact the appropriate agencies and set up IC system.	County Sheriff Dept. OES County Fire Dept. County Parks Dept.	5.7
(A)	**veg2**	Prior to initiating any watershed activity, **consult the GIS database** for vegetation communities and associated rare, threatened, endangered, and sensitive species.		5.9
(A)	**veg3**	Prior to any watershed activity that may affect an **Ecological Sensitivity Zone** (ESZ), survey for special status plants and map observed occurrences on the GIS database.		5.9
(A)	**veg4**	Prior to initiating any construction project involving grading, proponent must prepare and implement a **grading plan**, subject to approval by SFPUC staff.		5.9
(A)	**veg9**	Follow **erosion control BMPs** for wetlands protection and stream and shoreline areas.	CDFG, COE	5.9
(A)	**wil1**	Prior to planning or construction, conduct **site-specific review of new structures**, linear facilities, parking lots, roads, or trails to avoid adverse impacts to wildlife.		5.10
(A)	**wil2**	Prior to undertaking any **watershed activity** in a high ESZ, survey affected habitat to determine the presence of listed or sensitive taxa and to minimize adverse effects.	CDFG	5.10

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(A)	**wil12**	**Monitor the effects of natural processes** that help maintain the variability of the ecosystem, but could negatively affect sensitive wildlife species.	CDFG, Lessees	5.10
(A)	**wil14**	**Monitor road kills** to better understand wildlife movement patterns. Design and install wildlife passage structures to minimize losses.	CDFG, CalTrans	5.10
(A)	**aqu1**	**Conduct site-specific review** to assure that new facilities or activities are not located within a High Water Quality Vulnerability Zone.		5.11
(A)	**aqu9**	**Create** new **wetland** habitat, where water sources are adequate, as part of a wetland mitigation banking system to offset impacts from SFPUC activities.	CDFG, USFWS, COE	5.11
(A)	**aqu11**	Once sediment detention basins are in place, establish **monitoring**, cleanup, and dredging **guidelines** dependent on sediment loading rate.	CDFG, USFWS, COE	5.11
(A)	**aqu12**	If needed for fire management, **install** long-term **sediment retention basins** that can be readily maintained.	CDF Lessees	5.11
(A)	**fis10**	Conduct studies and surveys in coordination with CDFG regarding **management of the Peninsula Fish and Game Refuge**.	CDFG	5.12
(A)	**cul1**	Conduct appropriate levels of **review prior to** undertaking activities involving **surface disturbance** and/or excavation to avoid damage to buried cultural resources.	Tribes, SHPO, County Parks Dept., CDFG, CDF	5.13
(A)	**cul2**	Authorize **data recovery** by qualified professionals when deposits cannot be preserved through avoidance or protection measures.	SHPO	5.13
(A)	**cul3**	When considering **demolition of a historic structure**, consult with an architectural historian to determine the feasibility and suitability of relocation.	SHPO	5.13
(A)	**cul4**	**Evaluate and document** the significance of **cultural resources** threatened by demolition through application of state and federal criteria.	SHPO	5.13

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(A)	**cul5**	**Employ non-destructive methods** of research. Data, objects, and specimens recovered from research sites shall be conserved and curated according to legal requirements.		5.13
(A)	**cul6**	**Suspend excavation activities** in the event that suspected cultural resources are uncovered; consult with a qualified archeologist.	SHPO	5.13
(A)	**cul7**	**Suspend excavation activities** in the event that **human remains** are discovered and immediately inform proper authorities.	County Coroner, CNAHC Tribes	5.13
(A)	**cul8**	When previously **unknown cultural resources** are discovered, report new findings to the California Historical Resources Information System (Information Centers).	SHPO	5.13
(A)	**cul10**	Prior to new construction, **consider re-use** of existing historic structures for departmental uses.		5.13
(A)	**env2**	**Review** new projects or activities **in coordination with BERM** to determine if such activities qualify as a "project" as defined by CEQA.	OER BERM	5.14
(A)	**env3**	Require consultation with the LRMS environmental compliance staff person as a **condition of all new leases and renewals** granted within the watershed.	OER, Lessees BERM Water Quality Bur.	5.14
(A)	**env4**	Require that SFPUC staff **consult** and get assistance from the LRMS **environmental compliance staff person** prior to implementation of watershed activities.	OER BERM	5.14
(A)	**env6**	Provide **comments on environmental documents** for projects within the larger watershed boundaries to ensure that potential adverse effects on SFPUC lands are mitigated.	BERM	5.14
(A)	**lea5**	Prior to approval of leases and permits requiring the use of pesticides, **review** the Chemical Application Management Program (**CHAMP**) prepared by the lessee or permitee.	Lessees Water Quality Bur. BERM	5.15
(A)	**lea6**	Prior to the approval of any lease or permit conduct a **GIS database query** to determine presence of significant cultural or natural resources.	Bur. of Commercial Lands	5.15

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(A)	**pub12**	**Collaborate** with appropriate agencies/groups on the development of **educational materials**.	Water Quality Bur., CDFG, GGNRA, County Parks Dept.	5.16
(A)	**pub14**	**Coordinate** with other applicable agencies and organizations in the compilation and maintenance of **resource databases**.	Water Quality Bur., CDFG, USFWS	5.16
(A)	**fic1**	**Evaluate costs and benefits** related to leasing, permitting, and public access activities on the watershed.		5.18
(A)	**fic2**	Continue/authorize or prohibit specific **lease and/or permit activities** based on the results of the cost and benefit analysis.		5.18
(A)	**fic3**	**Calculate** the **appropriate charges** for lease activities and permit fees using the cost/benefit analysis method discussed under Action fic1.	Bur. of Commercial Lands	5.18
(A)	**fic4**	**Modify existing leases and permit fees**, and set future leases and permits fees based on the calculations from Action fic3.	Lessees Bur. of Commercial Lands	5.18
(A)	**fic6**	**Evaluate costs and benefits** associated with specific management activities and tasks **prior to authorization** of funds.		5.18
(A)	**inf3**	As new data and findings become known, enter data into the **SFPUC GIS database**.		5.19
(A)	**inf4**	Prior to any operations and maintenance and/or construction activities, **request a database check** for any known sensitive ecological or cultural resources.		5.19
(A)	**inf6**	**Disseminate and acquire significant information** to and from applicable agencies and local and regional databases (e.g., California Natural Diversity Data Base).	USFWS, CDFG, CNPS, local colleges/ universities	5.19
(A)	**des4**	Prior to initiation of any new construction, or renovation/alteration, **construct permanent perimeter fencing** around the construction zone.		5.20
(A)	**des5**	Ensure **design guidelines** are met prior to approval of new construction activities or renovation/alteration of existing facilities, structures and roads.	County Parks Dept. Lessees	5.20

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

Phase	Mgmt. Actions	Description	Coordination	Section
(A)	**des6**	Prior to the design and construction of new facilities and trails ensure **compliance with all legally mandated accessibility standards**.	County Parks Dept.	5.20
(A)	**gol1**	Develop and implement new **practices to prevent water quality degradation** due to golf course operations and maintenance.	Water Quality Bureau, Lessee	5.21
(A)	**gol2**	Develop a comprehensive groundwater and surface **water monitoring program**.	BERM, Lessee	5.21
(A)	**gol3**	Develop and periodically update an **Integrated Pest Management (IPM) program**.	BERM, Lessee	5.21

[1] Phasing of the management actions is identified by one or more of the following categories: (1) Phase 1: within five years of plan adoption, (2) Phase 2: within ten years of plan adoption, (3) Phase 3: within twenty years of plan adoption, and/or: (A) on an As-Needed basis, and (B) at regular intervals throughout the life of the Plan.

List of Acronyms

Glossary of Terms

List of Acronyms

AB	Assembly Bill
ABAG	Association of Bay Area Governments
ADA	Americans with Disabilities Act
BARTC	Bay Area Ridge Trail Council
BERM	Bureau of Environmental and Regulatory Management
BEPA	Bald Eagle Protection Act
BMP	Best Management Practice
CalTrans	California Department of Transportation
CCSF	City and County of San Francisco
CDF	California Department of Forestry and Fire Protection
CDFG	California Department of Fish and Game
CE	Listed as Endangered, California Endangered Species Act
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFP	California Fully Protected, pursuant to CDFG Sections 3511, 4700, 5050, 5515.
CFR	Code of Federal Regulations
CHAMP	Chemical Application Management Program
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
COE	U.S. Army Corps of Engineers
CRLF	California red-legged frog
CSC	California Species of Special Concern
CT	Listed as Threatened, California Endangered Species Act
DBP	disinfection byproducts precursor
DHS	Department of Health Services
EBMUD	East Bay Municipal Utility District
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESZ	Ecological Sensitivity Zone
FAA	Federal Aviation Administration
FC	Candidate for Federal listing (taxa for which the U.S. Fish and Wildlife Service has sufficient biological information to support a proposal to list as Endangered or Threatened)
FE	Listed as Endangered on the Federal Endangered Species List
FESA	Federal Endangered Species Act
FPE	Proposed for listing on the Federal Endangered Species List
FT	Listed as Threatened on the Federal Endangered Species List
FY	fiscal year
GGNRA	Golden Gate National Recreation Area
GIS	geographic information system
GPS	global positioning system
HCP	Habitat Conservation Plan
IC	Incident Command
IPM	Integrated Pest Management
IPMP	Integrated Pest Management Plan
I-280	Interstate 280
LRMS	Land and Resource Management Section

MOU	Memorandum of Understanding
NEPA	Natural Environmental Policy Act
NMFS	National Marine Fisheries Service
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OER	Office of Environmental Review
OES	Office of Emergency Services
PCA	Pest Control Advisor
PG&E	Pacific Gas and Electric
ROW	right-of-way
RWQCB	Regional Water Quality Control Board
SFBOS	Board of Supervisors of the City of San Francisco
SFGS	San Francisco garter snake
SFPUC	San Francisco Public Utilities Commission
SFWD	San Francisco Water Department
SHPO	State Historic Preservation Officer
SMCL	Secondary Maximum Contaminant Levels
SMCPD	San Mateo County Parks Department
SOC	synthetic organic compound
SPARC	Systems Planning and Regulatory Compliance
SSA	State designated special animal, designated by CDFG biologists
SVWC	Spring Valley Water Company
SVWW	Spring Valley Water Works
THM	trihalomethane
UEB	Utilities Engineering Bureau
ULV	ultra-low volume
USFWS	United States Fish and Wildlife Service
USFS	United States Forest Service
WLPZ	Watercourse and Lake Protection Zones
WPC	Watershed Planning Committee
WQVZ	Water Quality Vulnerability Zone
WTP	water treatment plant

Glossary of Terms

Acre-foot - used to describe the amount of water that would cover one acre of land, one foot deep.

Adit - a vertical structure generally located within a reservoir through which pipes and valves pass, allowing access to these pipes and valves for reservoir operations.

Aggradation - the accumulation of deposits of alluvium which raise the elevation of a streambed or body of water.

Algaecides - chemicals or other agents used to destroy or inhibit algae.

Allelopathic - plants that naturally destroy surrounding vegetation to utilize all the sun and rain of the area.

Amphibian - a class of vertebrate animals whose young usually have gills and live in the water and later develop lungs (i.e., frogs, salamanders).

Anadromous (fish) - a fish that spawns and spends its early life in fresh water but moves into the ocean where it attains sexual maturity and spends most of its life span.

Annual (grasses) - a plant that completes its life cycle in a year or less; seed germinates and the plant grows, blooms, sets seed, and dies - all in one growing season.

Anoxia - a condition in which there is not enough oxygen or tissue oxidation.

Aspect - the direction toward which a slope faces; exposure.

Autecology - the study of relationships of individual species to their environment.

Best Management Practices (BMPs) - the techniques required to provide optimal results and minimize adverse impacts.

Biorational (controls) - pesticides that occur naturally or resemble naturally occurring substances.

Commensal - association between two different organisms in which each is beneficial to the other.

Conductivity - the power of conducting heat, electricity, etc.

Cubic feet per second (cfs) - used to describe water flowing one cubic foot per second.

Discing - the act of tilling/plowing soil with a round, flat object.

Disinfection byproducts precursor - represented by trihalomethane (THM) which refers to the natural organic carbon which exists in each watershed in the form of decayed vegetation, bark, and animal carcasses as well as animal waste.

Dry hydrant - an arrangement of piping with one end in the water and the other extending to dry land and available for connection to a pumper. The pipe system is non-pressurized and composed of relatively inexpensive materials. They are permanently installed in waterbodies and provide access to water in all weather conditions.

Exotic species - not native; foreign; those introduced from other climates or countries.

Exploratorium - an interactive, hands-on educational scientific museum in San Francisco which caters to children and young adults.

Feral (animal) - wild animals descended from previously domesticated ones.

Fetch (erosion) - the distance along open water or land over which wind blows.

Fuel break - an existing barrier, or one constructed before a fire occurs, from which all or most of the inflammable materials have been removed.

Fungicides - any substance that kills fungi or inhibits the growth of spores.

Geographic information system (GIS) - data storage and retrieval by which thematic data layers are input digitally and output in the form of maps and attribute data summaries for each theme.

Heliport -improved area (i.e., paved) where helicopters land and take off.

Herbicides - chemicals used to destroy or inhibit plants.

Herbivore - any of a large group of animals that feed chiefly on plants.

Hydrologic watershed - the total area of land surface from which an aquifer or river system collects its water.

Hypolimnetic aeration - the process of introducing oxygen into the lower reaches of a reservoir to eliminate taste, odor, and color problems without disturbing the stratification of the reservoir, thus retaining the deep, cold water of the hypolimnion for selective withdrawal.

Insecticides - chemicals or other agents that kill insects.

Lacustrine (deposit) - material deposited in lake water and later exposed either by lowering of the water level or by elevation of the land.

Lead agency - government agency with the principal responsibility for approving the Plan.

Lithology - rock type.

Macrophytes - a macroscopic or large plant, especially one living in water.

Microorganism - any microscopic or ultramicroscopic animal or vegetable organism; especially, any of the bacteria, protozoa, viruses, etc.; pathogens; coliform.

Model ordinance - an ordinance drafted by SFPUC for adoption by the various entities with jurisdiction over watershed lands.

Mycorrhiza - an intimate relationship between the root systems of trees and soil fungi.

Noxious (weeds or plants) - hurtful; harmful to health or morals; destructive.

Nutrients - carbon, nitrogen, and phosphorus; sources include vegetation, soils, and animal wastes; associated with decaying vegetation matter and animal wastes, absorbed onto soils, or leached through runoff.

Overwash (stream overwash) - the drift carried by a glacier stream and deposited on or beyond a frontal moraine.

Pacific Flyway - a corridor for birds migrating between North and South America.

Paleontology - the study of past life forms through fossils.

Particulates - particles of matter in either the liquid or solid state.

Pathogen - any microorganism or virus that can cause disease.

Perennial (grasses) - a non-woody plant that lives for more than two years; frequently used to refer to a plant whose top growth dies down each winter and regrows the following spring, but some perennials keep their leaves all year long.

Potable (water) - free of contaminants.

Predaceous (exotic aquatic species) - preying on other animals; predatory.

Propagula - a gemma or bud in certain algae which serves as a means of asexual reproduction.

Pupa - an insect in the stage of development between the larval and adult forms.

Raw water - untreated water with no additives.

Reclaimed water - urban waste water that becomes suitable for a subsequent use as a result of treatment.

Reinterment - to rebury or put back into the earth.

Rift - an opening made by or as if by splitting; a fissure.

Riparian - of, designating, or situated on the banks of a river, lake, or other body of water.

Rodenticides - chemicals or other agents that kill rodents.

Sedimentation - retention of sediments by reservoirs; can result in premature siltation.

Slope - the degree of deviation of a surface from horizontal.

Sterilants - an agent or chemical which causes sterility.

Stratified - arranged in or composed of strata of layers.

Synthetic organic compounds (SOCs) and volatile organic compounds (VOCs) - chemicals which are generally manufactured or are by-products of manufactured chemicals. VOCs usually evaporate, while SOCs, such as petroleum by-products, most frequently do not.

Taxa - a general term used for a taxonomic group collectively of any rank without being specific.

Terrestrial (habitat) - circumscribed by area; defined by physiognomic-dominant plant life-forms.

Transpiration - the process by which water moves up through the living plant and vapor leaves the plant and enters the atmosphere.

Treated water - water to which chemicals (e.g., chlorine) have been added and/or which has undergone filtration to meet drinking water standards

Trihalomethane (precursors) - refer to the natural organic carbon which exists in each watershed in the form of decayed vegetation, bark, and animal carcasses as well as animal waste. Used to represent the precursor for disinfection by-products (DBPs) in general.

Turbidity - suspended solids which pollute water; major contributor is sediment, mostly fine soil material eroded by natural geologic processes and by many land uses.

Watershed - the portion of the hydrologic watershed owned and managed by the San Francisco Water Department (also the Peninsula Watershed and the Alameda Watershed).

Wetland - transition zones from uplands to deepwater aquatic systems; include swamps, bogs, marshes, mires, fens, and other wet ecosystems; provide valuable functions such as organic exporters or inorganic nutrient sinks (filters between land and water).

U.C. BERKELEY LIBRARIES
C101747408